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PROJECT TITLE: ONLINE USED CAR ADVERTISING SYSTEM

ABSTRACT

This Online Used Car Advertising System will be developed with the objectives of utilizing the computer and information technology to provide an easy and convenient online car searching or car advertising in Malaysia. This system transcends across time and space, which means time and space will no longer be barriers. Users can search or advertise their cars at a different location and at anytime.

This system is a web-based application to provide car advertising and searching services. It consists of two sections, namely the user section and the administrator section. User section can be divided into two parts, namely the member and the non-member section. Non-members can only view details of cars while members can advertise their cars, search a car and use the 'send email' service that is not provided to non-members. Meanwhile, the administrator section will provide the administrator with facilities to manage records of its members, cars and car category and also to add administrator.

The web server for this system is the Internet Information Server (IIS) running under the Microsoft Windows 2000. Database will be created and stored from Microsoft SQL Server while Active Server Pages (ASP) will be the main programming language technology to develop the system based on the system requirements.

ACKNOWLEDGEMENT

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND TO PROJECT

Nowadays car plays an important role in human life. Many places are being developed and as a result, car becomes an essential need to most of people that can afford one. This can be proved as we can see the tremendous increase in number of cars on the road.

Buying a used car is an alternative other than buying a new car. To purchase a used car, the buyer can find his ideal car through car dealers, advertisement in newspapers, personal seller or even through agents. Unfortunately, these kind of method always give rise to problems such as time-consuming, limited choices, limited information, cost consuming, cheated by agents, etc. To reduce, if not eliminate, these problems, providing a web-based used car advertising system is one of the most effective solutions.

Used-car advertising system is a web-based system where some users can advertise their cars for sale, and at the same time, allow some other users to find their ideal car according to the information of cars provided. Both buyers and sellers benefit from this method of sales.

At the same time, due to the growing number of competitors and the rapid development of IT, car dealers have early had the intentions to expand their market through web-based car advertising system. By putting the information of the cars on the web, more users can be attracted and this can increase their competitive strength over others and also increase their sales and profit.

1.2 OVERVIEW

Used car advertising system is a database-driven, computerized, and web-enabled system that provides information about cars, such as make, model, price, year of make, location, transmission, registration number and other descriptions as provided by the users who intend to sell the car. The user can be car dealers or individuals. In order to convey information to the public, the system also displays the photos for each car.

The system allows its members to gain access and advertise their cars (as an owner) or search for their ideal car by browsing through all cars provided in the website (as a potential buyer) or do both activities, i.e. as a seller and as a potential buyer at the same time. Owners can advertise their cars in the web site for only a fair payment. Besides, a search function allows potential buyers to state their preference, such as model or any price range, and get a list of cars satisfy the criteria given. If the potential buyers are satisfied after reading the information of any car, he or she can send an email to the owner to make an appointment or to gain further information. Loan calculation function assists users by calculating monthly payments according to the loan amount, loan term and interest rate. It will help users to make good planning.

Besides, the system also allows non-members to view the information about several selected cars in the website. Others functions are not visible to them unless they register as a member and login. This is to ensure members' advantage and also for security purposes.

There is also an administrator module, which allows authorized administrators to manage information, to keep track of daily activities, and to do maintenance of property owner and potential buyer accounts. The administrators are also responsible to ensure everything run smoothly and under control.

1.3 OBJECTIVES

Used car advertising system is a system which allows its users to advertise their car and to search for their ideal car which best suites their preference throughout the whole country, on their own, rather than through the traditional car dealing companies or agents as practiced in the past. The objectives of this project has therefore been set: To design a system which enables transformation of the present used-car-trading business into one which utilizes the ever growing IT capabilities, i.e. a web-based advertising system. The purpose of this system is to solve the problems faced by the sellers and the buyers in the traditional method. This system will eliminate the problems of time constraint, limitation in choice, and traveling cost. This is achieved since the system only requires the users to register as buyers or sellers from wherever they can gain access to the Internet at their leisure.

In this system, sellers can advertise their used cars by providing related information and photos in the forms provided. All information will be stored in a database and then shown to the users in an attractive and suitable way. Potential buyers can use the email function provided by the system to gain contact with the seller for the car that they are interested in.

The system will contain a database that store tables of data regarding the car, with categories such as model and make. At the same time, this database will also include a table for user particulars, i.e. the membership system. It is essential for the login procedure of the system. The system also provides a user-friendly environment by using Graphical User Interface (GUI) approach, so it is easy for users to use and understand the system. Additional features such as the search function can also make the system more hassle-free for users.

1.4 SCOPE

- The project will focus on used cars intended for sale in Malaysia.
- Members can advertise their cars for sale or find their ideal car from those advertised cars. There can be a situation where a user is both a seller and a potential buyer at the same time.
- Non-member can view information about several cars in the website.
- There is an administrator module in the system to coordinate any online transaction. The administrator is able to keep track the car owners and potential buyers accounts and make sure it is updated.
- The system enables potential buyers to contact with the car owners through email. Any other personal contact or agreement between potential buyers and car owners are not under system control.
- All the payments will be done offline, where members who want to advertise their cars have to do the payment within a reasonable period so that their car advertising can be continued.

1.5 IMPORTANCE

- Save potential buyers' time

  Potential buyers can search for their ideal car by browsing through various types of cars and make consideration according to the information given. They no longer need to go to multiple companies to find their ideal car without knowing any choices or information.

- Save potential buyers' traveling cost

  From the potential buyers perspective, this system would be able to help them find their ideal car without traveling from place to place. Besides that, they can also get the information especially the market price according to the car make, model, year of make, etc. This is very important for them to prevent exploitation by agents who put higher price for the car, and so they will make wiser decisions.

- Provide larger market

  From the car dealers and personal car owners' perspective, this system will be able to help them expand their market, and also shorten the time to sell a car. The car can be introduced to more people since the car information can be obtained through the Internet at low cost. Market size will no longer be limited to geographical constraint.

- Save individual sellers' money

  Those individual sellers can advertise their cars by paying only for the period of time selected. The payment rate is cheaper than the payment rate for the agents in most cases, which might be lengthened further if less people know about the car, causing delay to date of successful sale.

- Increase users' choices by collecting information of all available used cars available for sale. Instead of visiting car dealers' company, users can choose used car provided by individual owners all over Malaysia. Availability of more choices enables users to do comparison and make better decision.

1.6 DEFINITIONS

Below are the definitions of some terms that are used in this project:

- Potential buyer

  Refer to someone that has high possibility to buy something. In this project, potential buyer refers to someone that has interest to buy a car.

- Authorized user

  Someone that is given authority or right to use something, in this case, the system.

- Used car

  Cars that have been used and are no longer in new condition.

- Field searching

  Ability to limit a search by requiring word or phase to appear in a specific field of documents.

- Authentication

  The computer security process of verifying a user's identity or the user's eligibility to access network resources.

- Internet

  The vast collection of inter-connected networks that all use the TCP/IP protocols.

CHAPTER 2: REVIEW OF LITERATURE

2.1 ROLE OF LITERATURE REVIEW

The main purpose of the literature review is to guide students or researchers using the best way to access and analyze information regarding their research topic. It also helps the students to recognize relevant information, hence synthesize and evaluate it according to the guiding concept. It helps students to develop their information seeking and critical appraisal skill.

2.2 APPROACH TO LITERATURE REVIEW

Information is essential to do a good research or analysis. For this project, several techniques have been taken to seek information. These techniques are as follow:

- Search information from the Internet

  Internet is the main source of information. Relevant information on web application, client-server and programming tools are analyzed. Current online car advertising systems are also viewed and compared. Many ideas can be gained by browsing current systems that are available in the Internet.

- Do analysis on the past year final year project

  Several past year final year projects have been studied in order to gain some skills on software development and as guidance in system design and requirements.

- Refer to newspapers and magazines

Reference on the latest newspapers such as New Straits Time, magazines and some car catalogs is one of the techniques to get information for the project.

- Have discussions with friends and lecturer

Useful advice and ideas have been given by the lecturer during every meeting. It is important to use those advice and ideas as a guideline when carrying out the system development process. Suggestions given by friends are also useful throughout the development of project.

2.3 FINDINGS

2.3.1 CURRENT ONLINE CAR ADVERTISING SYSTEM

- Carsales.com.au

Carsales.com.au Ltd. is an independently owned company whose mission in life is to bring users the best Automotive classified website in Australia.

This website is designed to provide visitors with numerous functions such as advertise a car, find a used car, find a new car, sell car privately, value a car, search a car, etc. Cars are listed with photos and full pages of information. If the user finds a dealer's car and interested in it, the system will take the user's details and immediately pass it to the dealer who is selling the car. Besides, an email containing the dealer's details will also be sent to the user. If a user is interested in a private car, the user can call the advertiser directly or use the system's enquiry service to get in touch with the seller via email. For selling cars privately, a private advertisement is priced at $10 and the advertisement remains live until the car is sold. The website also provides a valuation service where user

can get a market value for most second hand cars in Australia. Users also can use the search function, be it a 'search by model' or 'search by lifestyle', to look for a car.

Carsales.com.au is very popular since record shows that it is attracting 200,000 unique visitors per month. It really does very well in advertising work on car sales.

- Bendigo Car Sales (www.bgocarsales.com)

This website provides second hand car sales. All cars can be viewed according to the dealers. All information about the car, dealers' contact information, and a photo of the car is provided.

There is also a search facility where users can do a car searching through a form containing information such as keyword, price, year, body and etc. Cars that match the information submitted will be listed and available for further information. Bendigo Car Sales has an online trade in quote-related information about their car for sale and the car that they are interested in. A loan calculator function was provided to be a guide and it helps users calculate monthly payments according to the loan amount, loan term and interest rate.

- thecarexperience.com

thecarexperience.com provides a suite of tools to help dealers get more customers, more sales, and develop the skills and knowledge of dealers to succeed in the new economy. It provides unlimited new and used car leads, weekly uploading of used-car inventory, and create direct links to the dealer's website.

Search function is provided for the users whether to do searching according to the dealer or by car make. When using 'searching according to the dealer', a number of dealer's logos are listed and the user can click on any of them to get a list of new and used cars provided by the dealer. Details can be viewed, including 6 photos. Those car photos are presented in an interesting way and this will help to attract customers. 'Searching by car make' almost does the same thing, and the difference is only that those cars are listed according to the make that has been chosen. If the user is interested in the car being advertised, he or she can send a message to the seller for the selected car. This provided service will help users gain contact with the seller.

thecarexperience.com allows users to sell their cars by putting advertisement in the website. Users can choose to advertise their car for a period of time like 90 days or until sold. Users have to pay for the services provided.

Apart from that, this website also allows users to use "wanted submission form" if users cannot find a suitable car from the website. The Car Experience will assist the user to find the car that they requested by gaining the cooperation from over 1000 dealers, brokers and associates.

- Autoworld (www.autoworld.com.my)

Autoworld is one of the web-based online used car advertising systems found in Malaysia. This website provide users facilities such as car advertising, motorbike advertising and also accessories selling. For the car advertising, users are allowed to upload up to 3 pictures and it is provided without any charges. To view the information of the cars, users can explore it by car make or by dealer. A

quick search function is also provided. One of the strength of this system is that the information provided is very details. Others than the car information, the information of the owner is also provided so that the users can contact the seller directly if they are really interested in a particular car. Besides, several related links such as Internet Banking is also provided.

2.3.2 CLIENT-SERVER COMPUTING

In its most fundamental form, client/server involves a software entity (client) making a specific request, which is fulfilled, by another software entity (server). Figure 1 illustrates the client/server exchange. The client process sends a request to the server. The server interprets the message and then attempts to fulfill the request. In order to fulfill the request, the server may have to refer to a knowledge source (database), process data (perform calculations), control a peripheral, or make an additional request of another server. In many type of architecture, a client can make requests to multiple servers and a server can service multiple clients.

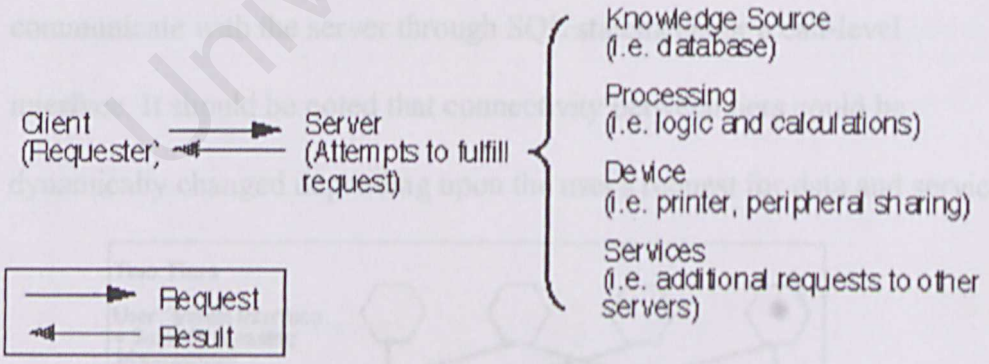


Figure 2.1: Client/Server Transactions

It is important to understand that the relationship between client and server is a command/control relationship. In any given exchange, the client initiates the

request and the server responds accordingly. A server cannot initiate dialog with clients. Since the client and server are software entities, they can be located on any appropriate hardware. A client process, for instance, could be resident on a network server hardware, and request data from a server process running on another server hardware or even on a PC. In another scenario, the client and server processes can be located on the same physical hardware box.

Architecture Types

We will focus on the most popular forms of implementation of two-tier and three-tier client/server computing systems.

- **Two-tier Architecture**

  In general, the user system interface client invokes services from the database management server. In many two-tier designs, most of the application portion of processing is in the client environment. The database management server usually provides the portion of the processing related to accessing data (often implemented in store procedures). Clients commonly communicate with the server through SQL statements or a call-level interface. It should be noted that connectivity between tiers could be dynamically changed depending upon the user's request for data and services.

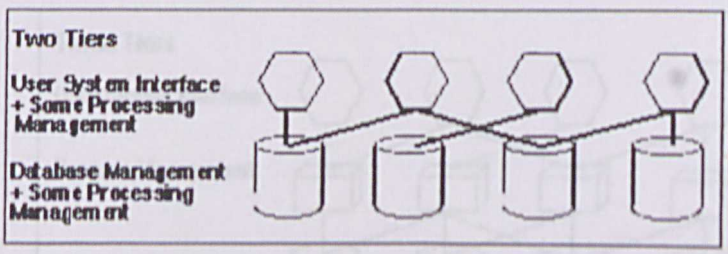


Figure 2.2: Two-Tier Client Server Architecture

- **Three tier architecture**

A three tier distributed client/server architecture includes a user system interface top tier where user services (such as session, text input, dialog, and display management) reside.

The third tier provides database management functionality and is dedicated to data and file services that can be optimized without using any proprietary database management system languages. The data management component ensures that the data is consistent throughout the distributed environment through the use of features such as data locking, consistency, and replication. It should be noted that connectivity between tiers could be dynamically changed depending upon the user's request for data and services.

The middle tier provides process management services (such as process development, process enactment, process monitoring, and process resourcing) that are shared by multiple applications. The middle tier server (also referred to as the application server) improves performance, flexibility, maintainability, reusability, and scalability by centralizing process logic. In addition, the middle process management tier controls transactions and asynchronous queuing to ensure reliable completion of transactions.

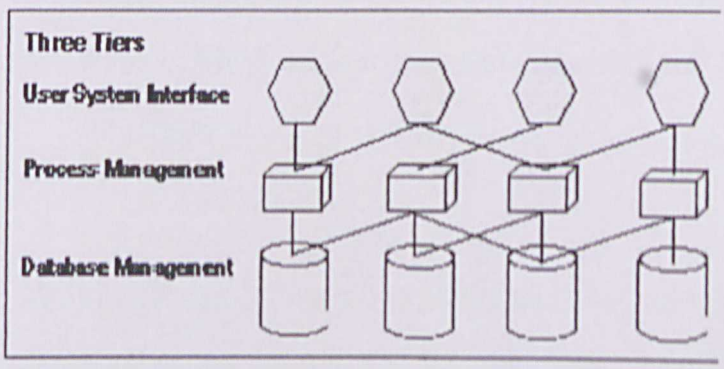


Figure 2.3: Three tier distributed client/server architecture

2.3.3 WEB APPLICATION ARCHITECTURE

Web architecture can also evolve from the client server application but needs extensive planning and is no simple task. Web applications use Internet protocols such as TCP/IP, HyperText Transfer Protocol (HTTP) and HyperText Markup Language (HTML) for implementation display and networking protocol to achieve architecture that are robust, scalable and that can accommodate rapidly changing technology.

2.3.4 WEB-BASED APPLICATION

A typical web-based application, by its browser/server nature, follows the two- or n-tier model. Applications designed for the World Wide Web place the least number of the applications on the client, and keep all the processing centralized on one or more servers. The following Figure 4 shows the Web-based Applications:

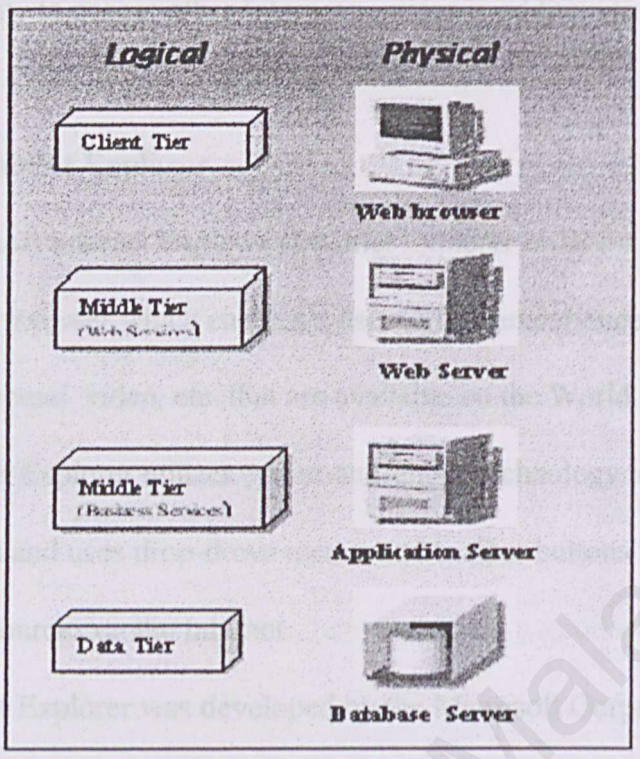


Figure 2.4: The Web-based Applications

2.3.5 WEB BROWSER

The Web Browser is the client program that users run on their local machine to gain access to a Web Server. It is a user-interface or document-presentation tool. It only knows how to take the information from the server and present it to the user. It is also able to capture data entry made into a form and get the information back to the server for processing. Web browsers are multimedia enabled. They can process text, graphics, audio and video, which are marked up or embedded in HTML documents. One of the powerful features of HTML documents is the function of hyperlinks.

Currently, the most popular browsers are Netscape Navigator/Communicator and Microsoft Internet Explorer. The features of a browser software have expanded

to encompass the ability to access other Internet services in addition to the World Wide Web.

- **Microsoft Internet Explorer**

  Microsoft Internet Explorer (Internet Explorer or IE for short) is a graphical web browser which enables a user to fully experience the hypertext, photographs, sound, video, etc. that are available on the World Wide Web.

  Internet Explorer utilizes "point-and-click" technology to select hypertext links and uses drop-down menus and toolbar buttons to navigate and access resources on the Internet.

  Internet Explorer was developed by the Microsoft Corporation and can be used on PCs running Windows 3.1 or better, or on Macintosh systems.

- **Netscape Navigator**

  Netscape Navigator is one of the best web browser available. It provides the user with brilliant graphics, sophisticated page layouts and high speed downloads. The Netscape Navigator gives a user the ability to read and send e-mail, transfer files (FTP), or read and post Usenet news. It can also be configured to access new media types, such as video, or run other applications within the browser through Helper Applications or Plugins.

2.3.6 PROGRAMMING TOOLS

2.3.6.1 Client-Side Programming Language

2.3.6.1.1 JavaScript

A scripting language developed by Netscape to enable Web authors to design interactive sites. Although it shares many of the features and structures of the full Java language, it was developed independently. JavaScript can interact with HTML source code, enabling Web authors to spice up their sites with dynamic content. JavaScript is endorsed by a number of software companies and is an open language that anyone can use without purchasing a license. JavaScript code can be imbedded in HTML pages and interpreted by the Web browser (or client). JavaScript can also be run at the server, as in Microsoft's Active Server Pages, before the page is sent to the requestor. Both Microsoft and Netscape browsers support JavaScript, but sometimes in slightly different ways. It is supported by recent browsers from Netscape and Microsoft, though Internet Explorer supports only a subset, which Microsoft calls *Jscript.*

2.3.6.1.2 VBScript

VB Script is a lightweight version of Visual Basic designed specifically for scripting applications that can be downloaded and run as part of the HTML code that comprises Web pages. VB Script is an alternative to Java Script and PERL, and will run across multiple platforms, including Windows, Macintosh, and Unix. VB Script will be supported in Microsoft's own browser implementations, including Internet Explorer and the Internet Add-on for Windows 95.

2.3.6.1.3 HTML

HTML (Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end.

HTML is a formal Recommendation by the World Wide Web Consortium (W3C) and is generally adhered to by the major browsers, Microsoft's Internet Explorer and Netscape's Navigator, which also provide some additional non-standard codes. However, both Internet Explorer and Netscape implement some features differently and provide non-standard extensions. Web developers using the more advanced features of HTML 4 may have to design pages for both browsers and send out the appropriate version to a user. Significant features in HTML 4 are sometimes described in general as dynamic HTML. What is sometimes referred to as HTML 5 is an extensible form of HTML called Extensible Hypertext Markup Language (XHTML).

2.3.6.2 SERVER-SIDE PROGRAMMING LANGUAGE

2.3.6.2.1 Active Server Pages

Microsoft® Active Server Pages (ASP) is a server-side scripting environment that you can use to create interactive Web pages and build powerful Web applications. When the server receives a request for an ASP

file, it processes server-side scripts contained in the file to build the Web page that is sent to the browser. In addition to server-side scripts, ASP files can contain HTML (including related client-side scripts) as well as calls to COM components that perform a variety of tasks, such as connecting to a database or processing business logic.

Some related facts:

- ASP is free for Windows NT, or Windows95/98 – Internet Information Server 3.0 had the first ASP with all its essential features. IIS4 (also called NT OPTION PACK 4) contains the latest ASP and all its goodies.
- ASP scripts can be tested offline with Personal Web Server (PWS) on Windows95/98.
- ASP code is mixed within HTML on a page – it does not need to be compiled separately or deployed. HTML coders can just add ASP commands to their page freely.
- ASP scripts are pure ASCII and can be edited with Notepad or more sophisticated tools like Visual InterDev.
- ASP code is not biased towards any browser – it runs on the server and can serve up pure HTML to any browser even one that supports no scripting.
- ASP can allow browser users to manipulate databases (view, edit, manage) from any browser by serving up HTML with ADO (active data objects) and allowing HTML web pages to generate database updates

which the server takes care of. Server databases can be from any vendor as long as an OLEDB or ODBC driver is available.

- ASP supports server components built with other languages. People familiar with Java, C++, Visual Basic and Delphi can assemble their compiled code easily into a component that HTML programmers can call within their ASP page.
- ASP supports VBScript syntax or Jscript syntax upon initial installation. VBscript is the most popular way most users code because it is simpler than Jscript.

2.3.7 SERVER TYPE

There are many types of different servers used in the marketplace today. They can be categorized and below are some of the category:

2.3.7.1 Web Server

Web servers allow user to serve content over the Internet using the Hyper Text Markup Language (HTML). The Web server accepts requests from browsers like Netscape and Internet Explorer and then returns the appropriate HTML documents. A number of server-side technologies can be used to increase the power of the server beyond its ability to deliver standard HTML pages; these include CGI scripts, server-side includes, SSL security, and Active Server Pages (ASPs).

- **Internet Information Server (IIS)**

Microsoft Internet Information Server (IIS) is built into the Microsoft Windows NT Server operating system. It was designed to deliver a wide

range of Intranets and the Internet server capabilities for corporate. IIS can be used alone as a Web server, or in conjunction with compatible technologies to set up Internet commerce, to access and manipulate data from a variety of data sources, and to build Web applications that take advantage of server script and component code to deliver client-server functionality.

2.3.7.2 Application Server

Application servers, whatever their function, occupy a large chunk of computing territory between database servers and the end user. Most broadly, this "country" is called "middleware" and that tells you something about what application servers do. First and foremost, application servers connect database information (usually coming from a database server) and the end-user or client program (often running in a Web browser). There are many reasons for having an intermediate player in this connection -- among other things, a desire to decrease the size and complexity of client programs, the need to cache and control the data flow for better performance, and a requirement to provide security for both data and user traffic.

Application servers have different roles, and not every company requires the same functionality. Scalability is a good example. Some companies might want an application server that simply helps them organize their applications for the Web, give them better control over the business logic they contain, and make it easier to monitor and secure the data. Other companies, especially big ones, do need to manage thousands of servers. For them, the scalability of an application server is crucial. So some application servers feature scalability, others feature other things, and some try to do everything.

2.3.7.3 Proxy Server

Schematically, a proxy server sits between a client program (typically a Web browser) and some external server (typically another server on the Web). The proxy server can monitor and intercept any and all requests being sent to the external server or that comes in from the Internet connection. This positioning gives the proxy server three key capabilities: filtering requests, improving performance, and sharing connections.

Filtering requests is the security function and the original reason for having a proxy server. Proxy servers can inspect all traffic (in and out) over an Internet connection and determine if there is anything that should be denied transmission, reception, or access. Since this filtering cuts both ways, a proxy server can be used to keep users out of particular Web sites (by monitoring for specific URLs) or restrict unauthorized access to the internal network by authenticating users. A proxy can also examine the content of transmissions for "inappropriate" words or scan for viruses, although this may impose serious overhead on performance.

The other aspect of proxy servers, improving performance, is far less controversial. This capability is usually called proxy server caching. In simplest terms, the proxy server analyzes user requests and determines which, if any, should have the content stored temporarily for immediate access. If a page is requested repeatedly, the proxy server would cache it for immediate delivery to the Web browser. Cache management is a big part of many proxy servers, and it is important to consider how easily the cache can be tuned and for whom it provides the most benefit.

Some proxy servers, particularly those targeted at small business, provide a means for sharing a single Internet connection among a number of workstations. While this has practical limits in performance, it can still be a very effective and inexpensive way to provide Internet services, such as e-mail, throughout an office.

2.3.7.4 Mail Server

E-mail is generally considered the most important service provided by the Internet, which makes servers that move and store mail, Mail Server, a crucial piece of software. For Internet mail servers, a very important factor is the support of standards. The major protocols are SMTP (Simple Mail Transfer Protocol) for outgoing mail and POP3 (Post Office Protocol) for incoming mail. The highly publicized viruses that attack through e-mail clients have put the spotlight on e-mail as a vulnerable point in an enterprise's firewall. In response, mail server vendors (along with major client vendors such as Microsoft) have begun producing add-ons and built-in features that will help to scan mail, segregate questionable messages, and deal with viruses and spam.

2.3.7.5 Database Server

The database server plays a vital role in Internet application development. The database server can be used to store, search and retrieve information that were stored in a database.

2.3.7.6 Certificate Server

The certificate server was developed to help ensure data integrity for the Web sites or applications. Data integrity is composed of 2 parts. In the first part, client and server authentication, it helps to ease the proof for client and server authentication

and then issuing digital certificates for legal vendor. The second part, maintaining data integrity over the Internet, is to ensure data protection while information is being transferred from web server to client browser.

2.3.7.7 Firewall

A firewall is a set of related programs, located at a network gateway server that protects the resources of a private network from users from other networks. (The term also implies the security policy that is used with the programs.) An enterprise with an intranet that allows its workers access to the wider Internet installs a firewall to prevent outsiders from accessing its own private data resources and for controlling what outside resources its own users have access to. A firewall is often installed in a specially designated computer separate from the rest of the network so that no incoming request can get directly at private network resources.

2.3.8 DATABASE

Database is a shared collection of logically related data, designed to meet the information needs of an organization.

2.3.8.1 Microsoft SQL Server 2000

SQL Server 2000 provides agility to data management and analysis. From a data management and analysis perspective, it is critical to turn raw data into business intelligence and take full advantage of the opportunities presented by the Web. A complete database and data analysis package, SQL Server 2000 lead to the rapid development of a new generation of enterprise-class business applications. It is a

fully Web-enabled database product, providing core support for Extensible Markup Language (XML) and the ability to query across the Internet and beyond the firewall.

2.3.9 OTHERS

2.3.9.1 Microsoft Windows 2000 Professional

Windows 2000 Professional is the Windows operating system for business desktop and laptop systems. It is used to run software applications, connect to Internet and intranet sites, and access files, printers, and network resources.

Built on Windows NT® technology and the easy-to-use, familiar Windows® 98 user interface, Windows 2000 Professional gives business users increased flexibility. The integrated Web capabilities let you connect to the Internet from anywhere, at anytime—giving your company access to host of flexible, cost-effective communications options. In addition, broad peripheral and mobile computer support make Windows 2000 Professional an ideal operating system for a workforce that increasingly relies on notebook computers.

2.3.9.2 SQL

Over the last few years, Structured Query Language, or SQL has become the standard relational database language. The American National Standards Institute (ANSI) defined a standard for SQL. More than 100 database management systems now support SQL, running on various hardware platforms from personal computers to mainframes.

Objectives of SQL:

- Create the database and relation structures

- Perform basic data management tasks, such as the insertion, modification, and deletion of data from the relations.
- Perform both simple and complex queries to transform the raw data into Information.

SQL is an example of a transform-oriented language, or a language designed to use relations to transform inputs into required outputs. As a language, SQL has two major components: A Data Definition Language (DDL) for defining the database structure and A Data Manipulation Language (DML) for retrieving and updating data.

Below are the available SQL DML statements:

- SELECT To query data in the database
- INSERT To insert data into a table
- UPDATE To update data in a table
- DELETE To delete data from a table

2.4 SUMMARY OF LITERATURE

From the research through Internet, it is not difficult to come across an online used car advertising system. These kinds of systems are not so common in Malaysia. Most of the web sites about used car advertising system are for oversea countries.

From the analysis of current web sites, one feature that can be found is that most of the web sites provide services such as car advertising, car searching, view cars by model or price and many others. However, some advanced systems provide trade-in services, loan calculation, attractive pictures with special effects and car

searching from other related sites' services for their users to enhance the functionality of the site.

As a summary, an online used car advertising system should provide some basic services such as car advertising, car searching and also provide contact within the potential buyer and the seller. However, some extra services such as trade-in service and loan calculation service can be added in order to gain competitive edge over other related web sites. Besides, a deeper understanding about those technologies is gained after the analysis had been done for the collected information.

2.5 RELATIONSHIP TO PROPOSED PROJECT

By exploring a lot of different online used car advertising web sites that are currently available, information and knowledge can be gained. All advantages and goal points of these web sites will be incorporated into the development of the proposed system after some consideration about the feasibility. At the same time, the disadvantages that was found from these current web sites will be avoided as much as possible.

After collecting the information about web-based application, web browser, programming tools, server types and database management system, comparison among all those available choices can be done. As a result, a better selection can be made in choosing programming tools, servers or other related aspects to be used in the proposed system. As an example, the proposed system will use ASP because of the features provided and high suitability of ASP to the system. It includes performance, security and relatively low cost. Besides, it is also well supported by

many applications from Microsoft especially such as the integration with Microsoft Internet Information Server, VBScript, and Jscript.

CHAPTER 3: METHODOLOGY

3.1 PROJECT OBJECTIVES

Used car advertising system is a system that lets users advertise and find a used car in the Internet rather than doing so through the traditional car dealers' companies or through agents that are available in the market as in the past. It will see a transformation from the manual car selling and searching, to the electronic car selling and searching, made available in the Internet. This system will eliminate the problems of time, limited choices and traveling cost faced by the traditional method since users need only to register as a member.

The system will be able to let the users act as the sellers to advertise their used cars by providing related information and photos; as well as the potential buyers to find a suitable car for them from the system. Members of the system can edit their profiles or their car information anytime. Potential buyers can use the email function provided by the system to gain contact with the seller of the car that they are interested in.

The system will contain database that will contain tables about information of the car and their categories and also the table for user particulars, which is the membership system. The system also provides user-friendly interface by using Graphical User Interface (GUI) approach so that it is easier for the users to use and understand the system.

Besides that, the system will have the search engine to reduce the users' time to search for the items in the system and a loan calculation service.

3.2 DEVELOPMENT METHODOLOGY

The waterfall model with prototyping has been chosen as the system process model. Figure 3.1 below shows the waterfall model with prototyping.

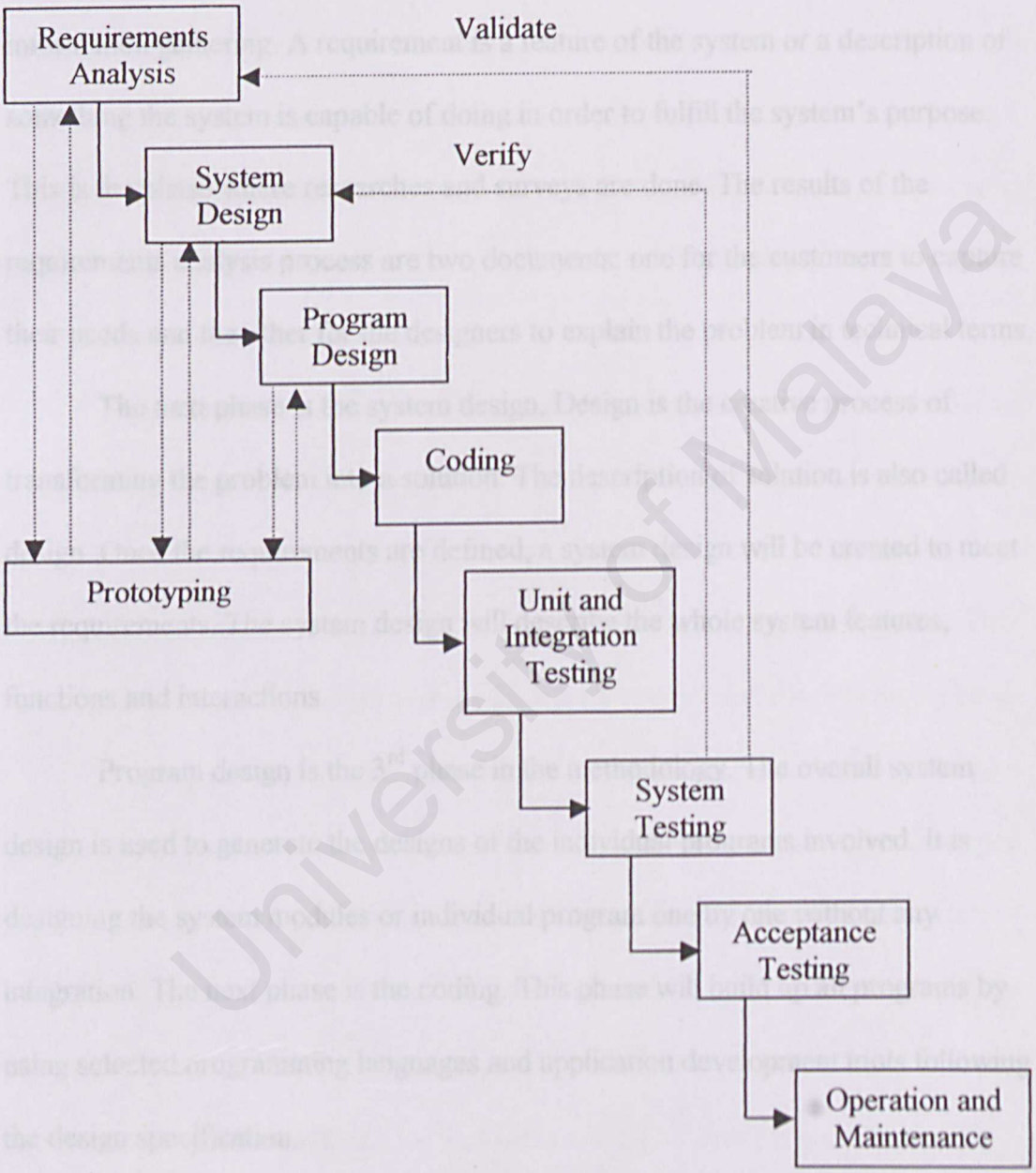


Figure 3.1: Waterfall model with prototyping

This system process model contains 8 phases, which are the requirement analysis, system design, program design, coding, unit and integration testing, system testing, acceptance testing and operation and maintenance.

The first phase in this methodology is requirement analysis, which requires information gathering. A requirement is a feature of the system or a description of something the system is capable of doing in order to fulfill the system's purpose. This is the phase where researches and surveys are done. The results of the requirements analysis process are two documents: one for the customers to capture their needs and the other for the designers to explain the problem in technical terms.

The next phase is the system design. Design is the creative process of transforming the problem into a solution. The description of solution is also called design. Once the requirements are defined, a system design will be created to meet the requirements. The system design will describe the whole system features, functions and interactions.

Program design is the 3rd phase in the methodology. The overall system design is used to generate the designs of the individual programs involved. It is designing the system modules or individual program one by one without any integration. The next phase is the coding. This phase will build up all programs by using selected programming languages and application development tools following the design specification.

The phase after the coding phase is the unit and integration-testing phase. The purpose of unit testing is to ensure that each module behave according to the specification defined during program design phase. It checks each coded module for

the presence of bugs. Later, the system will be built by adding one piece to the next until the entire system is operational.

The next phase, system testing, involves a test of the whole system to make sure that the functions and interfaces specified initially have been implemented properly. The phase after system testing is the acceptance-testing phase. This phase is to ensure that the system built meet the requirements and the project objectives. The last phase is the operation and maintenance phase. After the system is accepted, it will be delivered, and maintenance will be provided if anything goes wrong, or if needs and requirements have changed.

The waterfall model with prototyping is chosen because waterfall model can suggest to the developer the sequence of events they should expect to encounter. It can be very useful in helping developers lay out what they need to do and developer also can gauge how close the project is to completion at a given point in time. This model also enables developers to make necessary preparation for the coming phase.

Prototyping is used with waterfall model because it can help the developers to enhance their understanding about the system. Prototype is a partially developed product that enables customers and developers to examine some aspect of the proposed system and decide if it is suitable or appropriate for the finished product. For example, developers may build a system to implement a small portion of some key requirements to ensure that the requirements are consistent, feasible, and practical.

The prototyping approach is based on the premise that users do not know exactly what they want until they actually have a chance to see and work with the

system or part of the system. The system developers then build the system using the feedback supplied by the users.

There are two approaches to prototyping: evolutionary and throwaway. A throwaway prototype is a software developed to learn more about a problem or explore the feasibility or desirability of possible solutions. A throwaway prototype is exploratory, and it is not intended to be used as an actual part of the delivered software. On the other hand, an evolutionary prototype is developed to learn about a problem and form the basis for some or all of the delivered software. Once the requisite knowledge is gained, the prototype is then adapted to satisfy the better understood needs.

The reasons why the prototype methodology is important are show below.

- Requirements are often poorly understood.
- Requirements usually change during the development process.
- Current requirements remain only partially understood until after users have had an actual opportunity to use a system.

For the proposed system prototype, it will be presented to the car dealers to let them see and work with the system or part of the system. Feedback supplied by them will be used to make correction or modification in order to fulfill user and system requirements.

There are also two important activities as depicted in figure 3.1, i.e. validation and verification. Validation ensures that the system has implemented all of the requirements, so that each system function can be traced back to a particular requirement in the specification. Verification ensures that each function works

correctly. That is, validation makes sure that the developer is building the right product (according to the specification) while verification checks the quality of the implementation.

3.3 RATIONALE FOR PROPOSED METHODOLOGY

I intend to use the waterfall model with prototyping because of some characteristics and advantages gained by using it. Below are the advantages gained in using this methodology:

- It presents a very high-level view of what is going on during development, and it suggests the sequence of events a developer should expect to encounter.
- It is very useful in helping developers lay out what need to be done.
- Its simplicity makes it easy to explain to others who are not familiar with software development.
- It makes explicitly which intermediate products are necessary in order to begin the next stage of development.
- The subprocess, i.e. prototyping, can help to examine some aspects of the proposed system and decide if it is suitable.
- Prototyping helps to reduce cost by discovering the problems of consistency and feasibility of the system at the earlier stage rather at the most costly stage

3.4 REQUIREMENTS ANALYSIS

Requirements analysis is a very important phase in ensuring success of a system. This is because the acceptability of the system after it has been developed all depends on how well it meets the users' needs, and how well it supports the work to be automated. The system will not meet the expectation if a system analyst does not realize the user requirement for the system. The analysis from literature review, that includes analysis of some available systems, and other studies will help to determine a set of system requirements for the online used car advertising system.

The process of determining the requirements for the system begin with the information and system related materials collecting. Figure 3.2 below shows the steps of the requirements analysis.

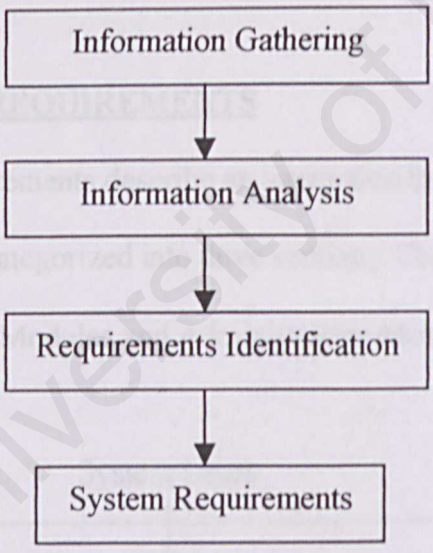


Figure 3.2: Process of determining system requirements

- Information Gathering

  Information collected through research via newspaper, Internet and magazines to get related materials to the system.

- Information Analysis

Analyze collected information or materials and identify functions provided by other related systems. Effectiveness and importance of the functions is recognized.

- Requirements Identification

  Requirements of the proposed system should be identified by using the knowledge gained from the earlier analysis.

- System Requirements

  A set of system requirements, which includes functional or non-functional requirements that have been identified, will be used throughout the development of the system.

3.4.1 FUNCTIONAL REQUIREMENTS

Functional requirements describe an interaction between the system and its environment. It can be categorized into three sections. These sections are Member Modules, Non-Member Modules and Administration Modules.

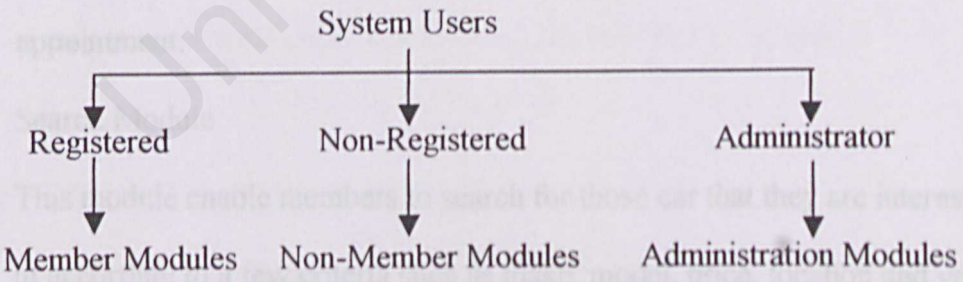


Figure 3.3: Types Of System Users

3.4.1.1 MEMBER MODULES

- Login Module

  Enable member to login to the system with their valid email and password.

- Forgot Password Module

  If member forgot their password, they can use this module to get an email, which contain their password after they enter their valid email.

- Vehicle Advertise Module

  This module enables members to enter their car information in the system through the car advertising form.

- Car Information Module

  This module enables members to view full information of the cars, which were advertised for sale. Information such as car photo, model, year of make and etc. are provided.

- Email Module

  This module enables members to send emails to the owner of the car that they are interested in to get further information or make any arrangement and appointment.

- Search Module

  This module enable members to search for those car that they are interested in according to a few criteria such as make, model, price, location and year of make.

- Vehicle Editing Module

  This module enables members to change their vehicle's information.

- Profile Editing Module

  This module is used for members to change their personal/company information.

- Loan Calculation Module

  This module allows members to use it to calculate monthly payment according to the loan amount, loan term and interest rate.

- Contact Module

  This module enables members to make contact with the system's administrator or the company.

3.4.1.2 NON-MEMBER MODULES

- Registration Module

  This module allows non-member users to register as a member of the system so that they can use all functions provided by the system like any other member.

- Car Information Module

  This module enables non-members to view information of cars.

3.4.1.3 ADMINISTRATION MODULES

- Vehicle Record Maintenance Module

  This module is used by the administrator to customize and monitor the vehicle's information. It includes the approval or decline for vehicle advertising by the administrator.

- User's Accounts Maintenance Module

  This module enables the administrator of the system to view and monitor the user's information.

- Car Category Maintenance Module

  This module is used for administrator to view and monitor the information of the car category.

- Add Administrator Module

  Administrator can add new administrator of the system by using this module.

3.4.2 NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements are essential definition of system properties and constraints under which a system must operate. Although these requirements are very subjective, they are still very important to ensure the success of the system.

- Reliability

  Application system reliability is important to ensure that the software and hardware do not cause unnecessary failure or downtime when they are used in a reasonable manner.

- Response Time

  The response time should be within a reasonable interval in retrieving any data or information. Good application systems should have shorter response time.

- User-friendly

System should have a user-friendly interface so that it is easy to use and understand. Graphical User Interface (GUI) approach should be applied.

- Availability

  All the system data and applications should be ready in use at all time.

- Manageability

  The application system, hardware and software should be able to be managed and operated easily.

- Robustness

  The system should be able to handle or at least avoid disaster in the face of unexpected circumstances such as input of improper data.

- Security

  The system should be able to prevent unauthorized users' access to the system.

3.5 FEASIBILITY STUDIES

After the analysis of requirements, development methodology and other related topics, the feasibility of the Online Used Car Advertising System in several aspects such as operational, technical and economical can be determined. The feasibility of the system is important to ensure that the system can be built with available sources and technology to perform how it is supposed to.

- Operational Feasibility

  The proposed system will be completed within the period of time as expected according to the complete research, analysis and planning. The

system can be used after it is developed and pass several testing processes. The system will meet the requirements by allowing users to advertise and find their cars. The system will run under the control of the administrator who will administer all records and add new category of cars. All of the services provided by the system can be gained by users as long as they meet the hardware and software requirements.

- Technical Feasibility

  The proposed system is feasible for the technical aspect since no sophisticated or extra powerful technical support is needed to implement the system. System can be built by developers who have reasonable knowledge in programming, software engineering, networking and business. As an example, using existing SmartUpload service can upload photos. On the other hand, users of the system do not need any extra knowledge to use the system.

- Economical Feasibility

  The development of this system does not require large amount of cost. It can be built as long as the developer has met the minimum hardware and software requirements. Many functions that will be used are free, such as SmartUpload. Once the system is in use, service provider will gain money from the members in the form of payment for the car advertisement. The benefits gained by the system will be more than the cost of developing the system, since this kind of systems are not so common in Malaysia. This can be determined through the concept in the business community, Return On Investment (ROI).

3.6 SYSTEM REQUIREMENTS

3.6.1 SYSTEM DEVELOPER REQUIREMENTS

- Hardware

Table 3.1 System Developer Hardware Requirements

Processor	450 Mhz or above
RAM	Minimum 128 Mb
Hard Disk	10 GB or above
Other	Others standard computer peripherals

- Software

Table 3.2: System Developer Software Requirements

Web Server	IIS (Internet Information Server)
Database Server & Application	Microsoft SQL Server 2000
Database Designing	SQL
Operating System	Microsoft Windows 2000 Professional
Server-side Scripting	ASP (Active Server Pages)
Client-side Scripting	JavaScript, VBScript
Web Browser	Internet Explorer 4.0 or above Netscape Communicator 4.0 or above
Web Pages Coding	HTML (Hypertext Markup Language)
User Interface Designing	Macromedia Dreamweaver UltraDev 4.0
Documentation & Scheduling	Microsoft Word 2000, Microsoft Visio, Microsoft Project 2000

3.6.2 SYSTEM USERS REQUIREMENTS

- Hardware

Table 3.3: System Users Hardware Requirements

Processor	450 Mhz or above
RAM	Minimum 128 Mb
Hard Disk	10 GB or above
Other	Reasonable quality dial-up connection line Others standard computer peripherals

- Software

Table 3.4: System Users Software Requirements

Operating System	Microsoft Windows 98, 2000, ME
Browser	Internet Explorer 4.0 or above Netscape Communicator 4.5 or above

3.7 SYSTEM DESIGN

Based on the user requirements and the detailed analysis of the desired system, the new system will be designed. This is the system design phase. It is an important phase in the development of a system where requirements for the system are translated into the system characteristics. The design proceeds in two stages as stated below:

- Preliminary / General Design

  In this stage, the features of the new system will be specified. The cost of implementation and the benefits that will be derived are estimated. If the project is still considered to be feasible, then the next stage, detail design will be continued.

- Structure / Detail Design

  In the detail design stage, computer oriented work will begin. At this stage, the design of the system becomes more structured. Structured design is a blueprint of a computer system solution to a given problem with the same components and inter-relationship among the same components as the original problem. Input, output and processing specifications are drawn up in

detail. The programming language and the platform in which the new system will run are also decided.

Tools and techniques that can be used for system designing are:

- Flowchart
- Data Flow Diagram (DFD)
- Data Dictionary
- Structure Chart

3.7.1 DATABASE DESIGN

Database design is the process of creating a design for the database that will support system's operations and objectives.

The major aims for the database design are to:

- Represent the data and the relationships between data required by all major application areas and user groups.
- Provide a data model that supports any transaction required on the data.
- Specify a minimal design that is appropriately structured to achieve the stated performance requirements for the system such as response times.

The two main approaches to the design of a database system are referred to as 'top-down' and 'bottom-up'. The bottom-up approach begins at the fundamental level of attributes (that is, properties of entities), which through analysis of the associations between attributes, are grouped into relations that represent types of entity and associations between entities. This approach is appropriate for the design

of simple databases with a relatively small number of attributes. The process of normalization represents a bottom-up approach to design.

A more appropriate strategy for the design of complex databases is to use the top-down approach. This approach starts with the development of data models that contain a few high-level entities and relationships and then applies successive top-down refinements to identify lower-level entities, relationships, and the associated attributes. The top-down approach is illustrated by using the concepts of the Entity-Relationship (ER) model.

3.7.1.1 DATA DICTIONARY

The fully attributes of entity are identified and listed in the tables below. It helps to identify the definition of data in the system.

- Table: MEMBER

Description: This is the table for storing the particulars of a user who has registered as a member of the system.

Table 3.5: Data Structure of Member

Field Name	Description	Data Type	Field Size
MemberID	Member identification	NUMBER	10
MemberType	Type of member	CHAR	1
CompName	Name of company	CHAR	50
FName	First name	CHAR	20
LName	Last name	CHAR	30
Gender	Gender of member	CHAR	1
Email	Email of the member	CHAR	80
Password	Password of the member	CHAR	10
ConfirmPw	To confirm password of the member	CHAR	10
DOB	Data of birth of member	DATE	8
Add	Address	CHAR	80
Postcode	Postcode number	NUMBER	5
City	City of the member	CHAR	20
State	State of the member	CHAR	20

- Table: CAR_INFO

Description: This table is for storing the particulars of the car that will be inserted by the car owner.

Table 3.6: Data Structure of Car

Field Name	Description	Data Type	Field Size
CarID	Car identification	NUMBER	10
OwnerID	Owner identification	NUMBER	10
Make	Make of the car	CHAR	30
Model	Model of the car	CHAR	30
YearOfMake	Year of make of the car	NUMBER	4
RegNo	Car registration number	CHAR	10
Transmission	Transmission of the car	NUMBER	1
NoOfDoor	Number of doors	NUMBER	1
NoOfSeat	Number of seats	NUMBER	1
Price	Price of the car	NUMBER	10
Colour	Colour of the car	CHAR	15
CarStatus	Number of owner before	NUMBER	2
PSteering	Power steering	NUMBER	1
AirCon	Air conditioning	NUMBER	1
AirBag	Air bag	NUMBER	1
EWindow	Electronic windows	NUMBER	1
CentralLock	Central locking	NUMBER	1
Radio	Car radio	NUMBER	1
Cassette	Car cassette player	NUMBER	1
CDPlayer	Car CD player	NUMBER	1
Mileage	Mileage	NUMBER	8
ABS	ABS brakes	NUMBER	1
Alarm	Car's alarm	NUMBER	1
Rsensor	Car's reverse sensor	NUMBER	1
AcciFree	Accident Free	NUMBER	1
Pic1	File name for the 1st picture of the car	CHAR	30
Pic2	File name for the 2nd picture of the car	CHAR	30
Pic3	File name for the 3rd picture of the car	CHAR	30
Pic4	File name for the 4th picture of the car	CHAR	30
Pic5	File name for the 5th picture of the car	CHAR	30
City	Car's city	CHAR	20
State	Car's state	CHAR	20
Duration	Duration for the publishing	NUMBER	2
Status	Status of publishing	NUMBER	1
Top	Shown in home page if mark 1	NUMBER	1

DtCreated	Create date	DATE	8
DtModify	Modify date	DATE	8

- Table: ADMIN

  Description: This table is for storing the administrator particulars such as id, name, password, etc.

Table 3.7: Data Structure of Admin

Field Name	Description	Data Type	Field Size
AdminEmail	Administrator's email	CHAR	80
AdminName	Administrator's name	CHAR	30
AdminPw	Administrator's password	CHAR	10
DtCreated	Create date	DATE	8

- Table: CATEGORY

  Description: This table is for storing the category/make of the car such as Toyota, Audi etc.

Table 3.8: Data Structure of Car Category

Field Name	Description	Data Type	Field Size
CategoryID	Category identification	NUMBER	10
CatName	Category Name	CHAR	30
CatDesc	Description of the category	CHAR	30
DtCreated	Create date	DATE	8

3.7.2 APPLICATION DESIGN

Application design is the design of the user interface and the application programs that use and process the database. All the functionality stated in the users' requirements specification must be ensured present in the application design for the database application. This involves designing the application programs that access

the data in the database and transaction design, which is the design of the database access methods.

In addition to designing how the required functionality is to be achieved, appropriate user interfaces to the database application have to be designed. This interface should present the required information in a 'user-friendly' way.

3.7.2.1 TRANSACTION DESIGN

Transaction is an action or series of actions, carried out by a single user or application program, which accesses or changes the content of the database. The purpose of transaction design is to define and document the high-level characteristics of the transactions required on the database system. This activity should be carried out early in the design process to ensure that the logical data model is capable of supporting all the required transactions. The important characteristics of transactions include:

- Data to be used by the transaction
- Functional characteristics of the transaction
- Output of the transaction
- Importance to the users
- Expected rate of usage

3.7.2.1.1 Structure Chart

The Online Used Car Advertising System consists of two main sections, which are User Section, and Administrator Section.

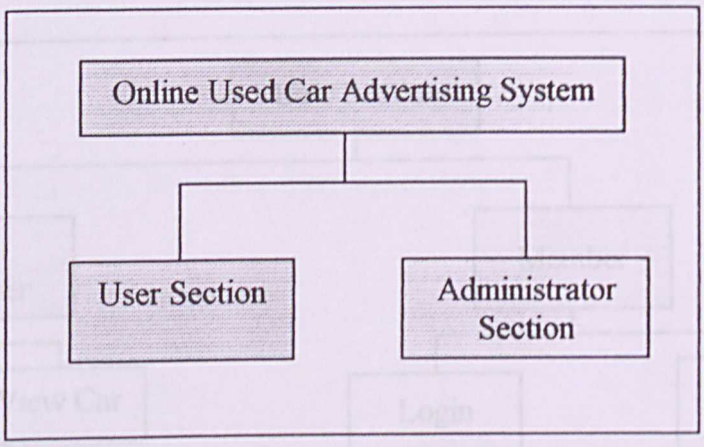


Figure 3.4: Structure Chart For Main System

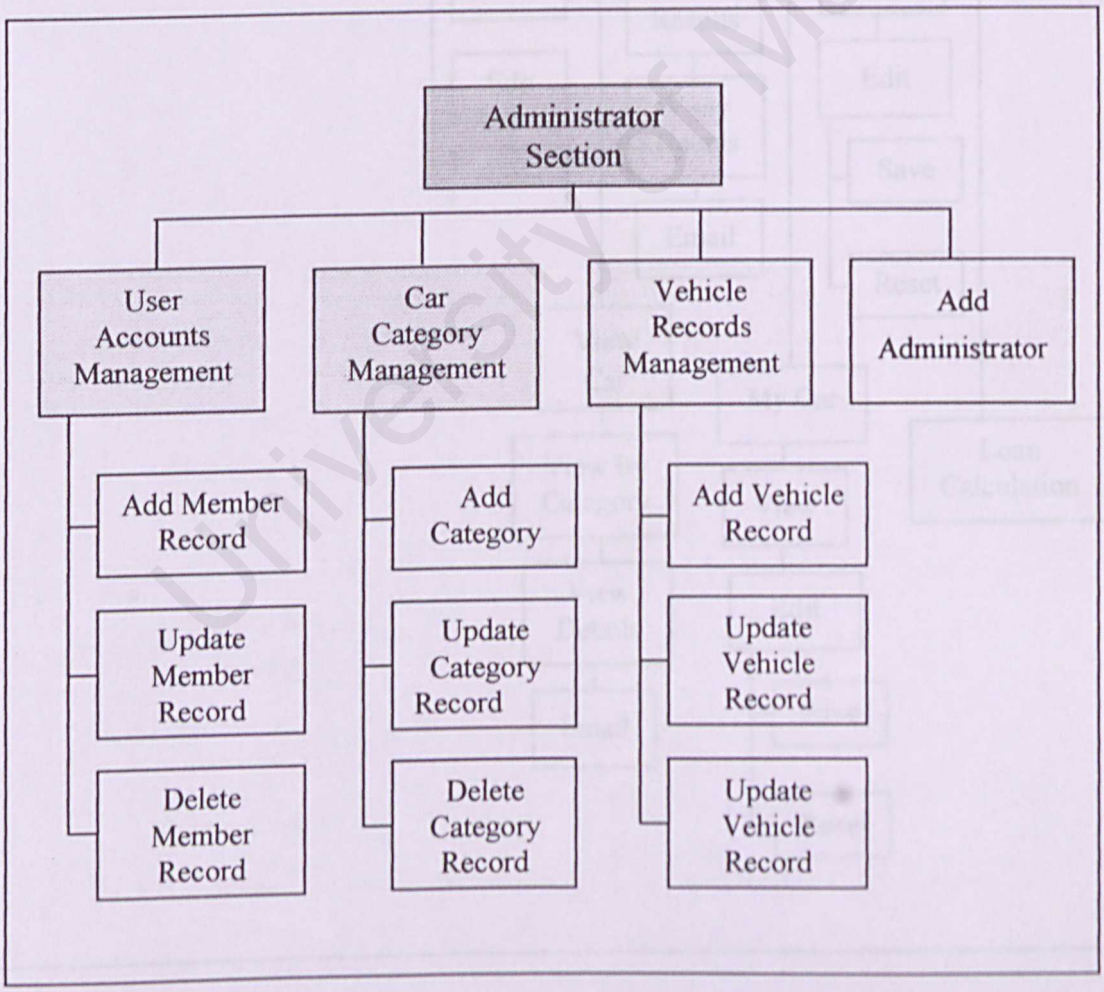


Figure 3.5: Structure Chart For Administrator Section

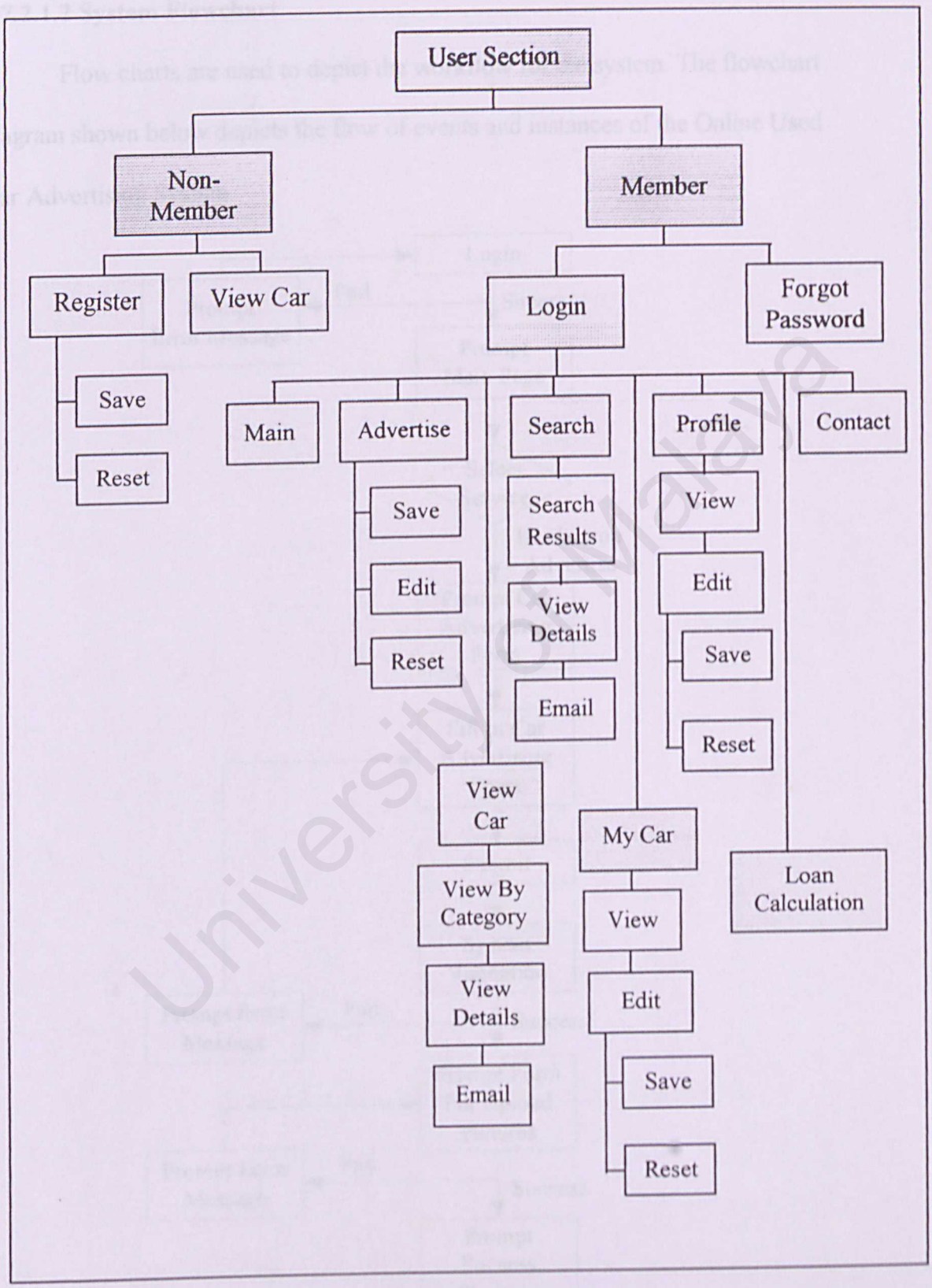


Figure 3.6: Structure Chart For User Section

3.7.2.1.2 System Flowchart

Flow charts are used to depict the workflow for the system. The flowchart diagram shown below depicts the flow of events and instances of the Online Used Car Advertising System.

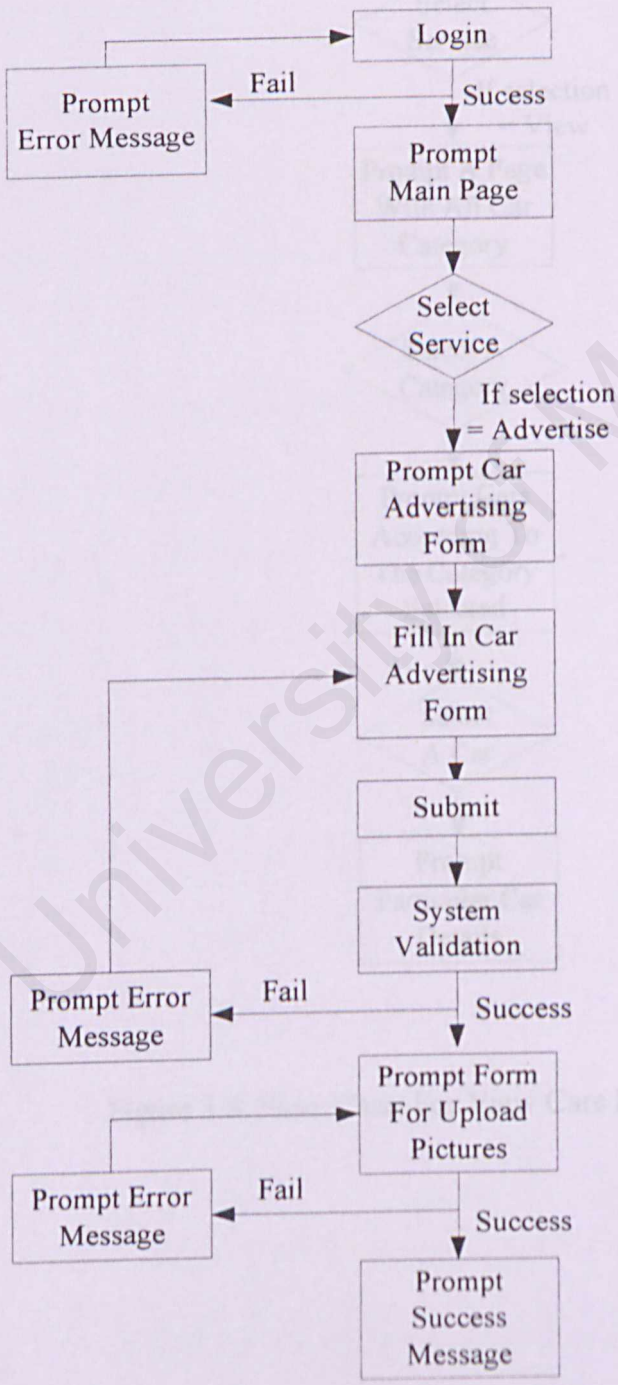


Figure 3.7: Flow Charts For Car Advertising

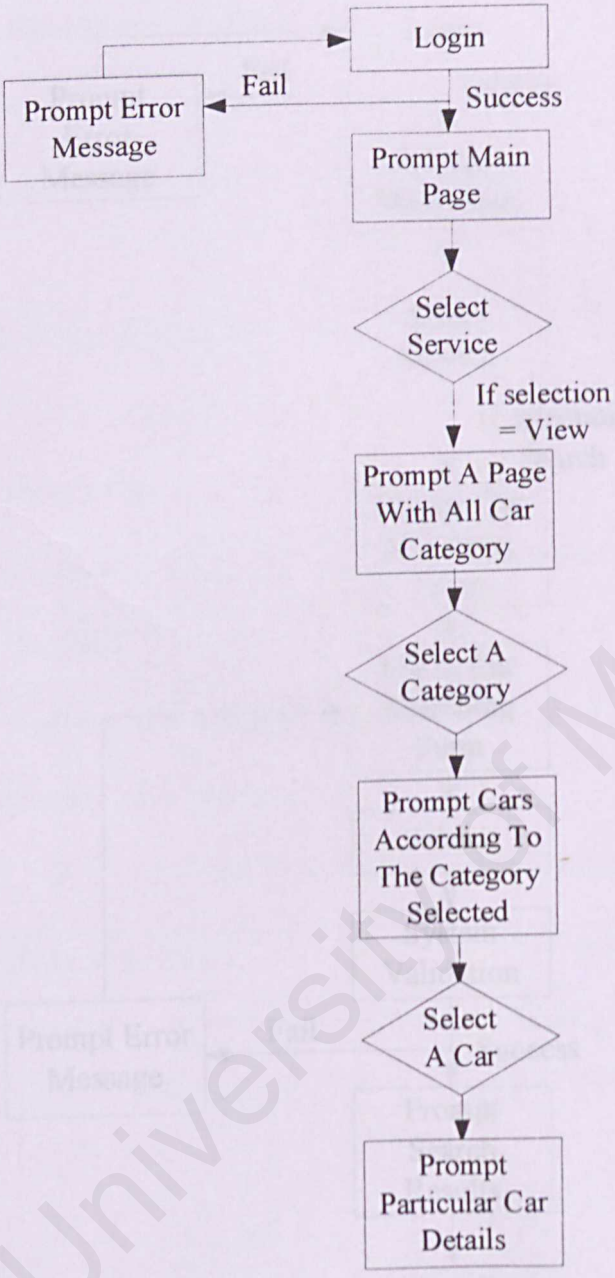


Figure 3.8: Flow Chart For View Cars By Category

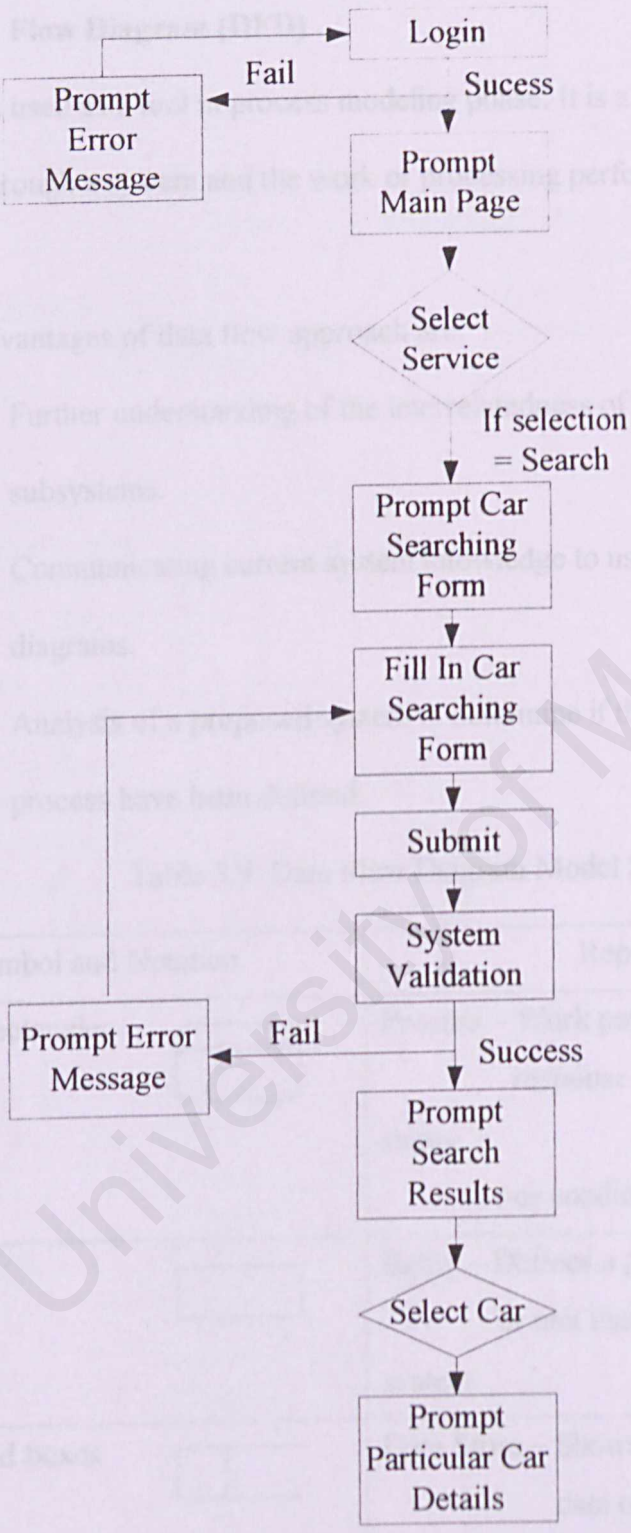


Figure 3.9: Flow Chart For Car Searching

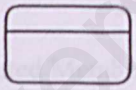
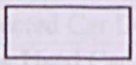
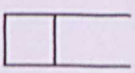
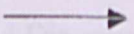
3.7.2.1.3 Data Flow Diagram (DFD)

DFD is used as a tool in process modeling phase. It is a tool that depicts the flow of data through a system and the work or processing performed by that system.

The advantages of data flow approach are:

- Further understanding of the interrelatedness of system and subsystems.
- Communicating current system knowledge to users through data flow diagrams.
- Analysis of a proposed system to determine if the necessary data and process have been defined

Table 3.9: Data Flow Diagram Model Symbols

Symbol and Notation	Represents
Rounded rectangle 	Process – Work performed on, or in response to incoming data flows or conditions.
Rectangle 	Entity – Defines a person, organization, or unit that interacts with system.
Open-ended boxes 	Data Store – Shows the location where data of the system are store.
Arrow 	Data Flow – Shows the path for movement of data from one location to another location in system.

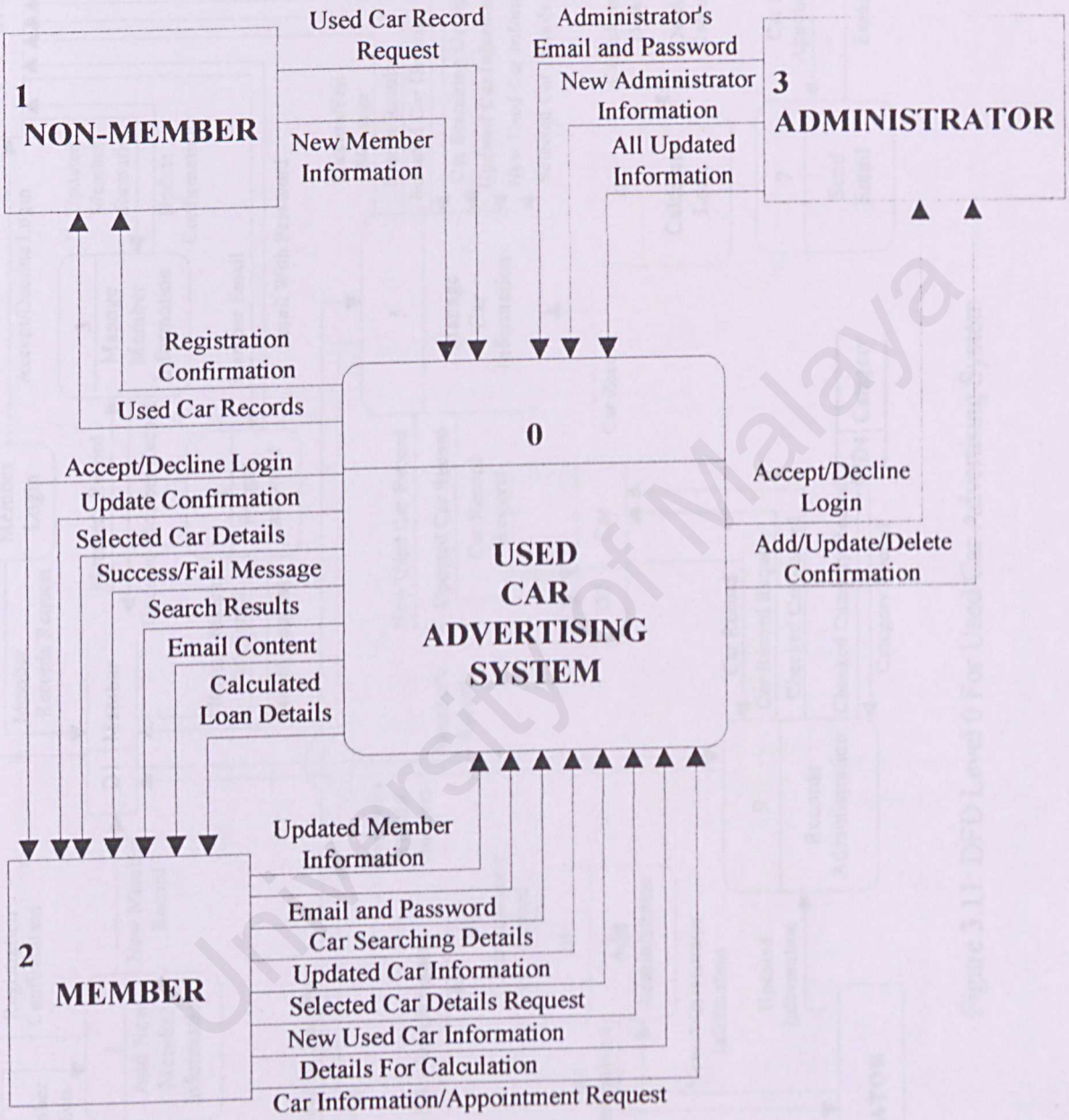


Figure 3.10: Context Diagram for Used Car Advertising System

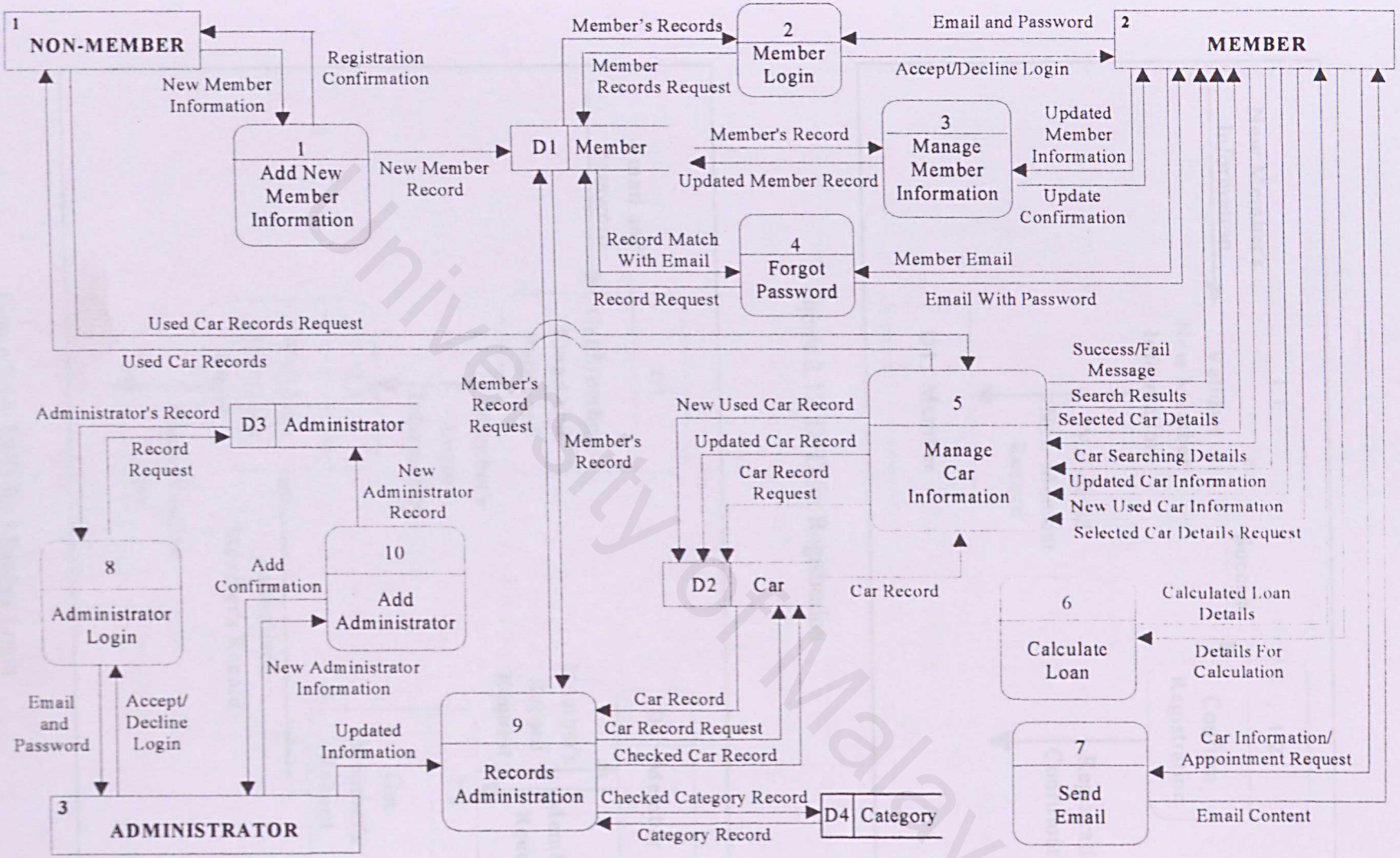


Figure 3.11: DFD Level 0 For Used Car Advertising System

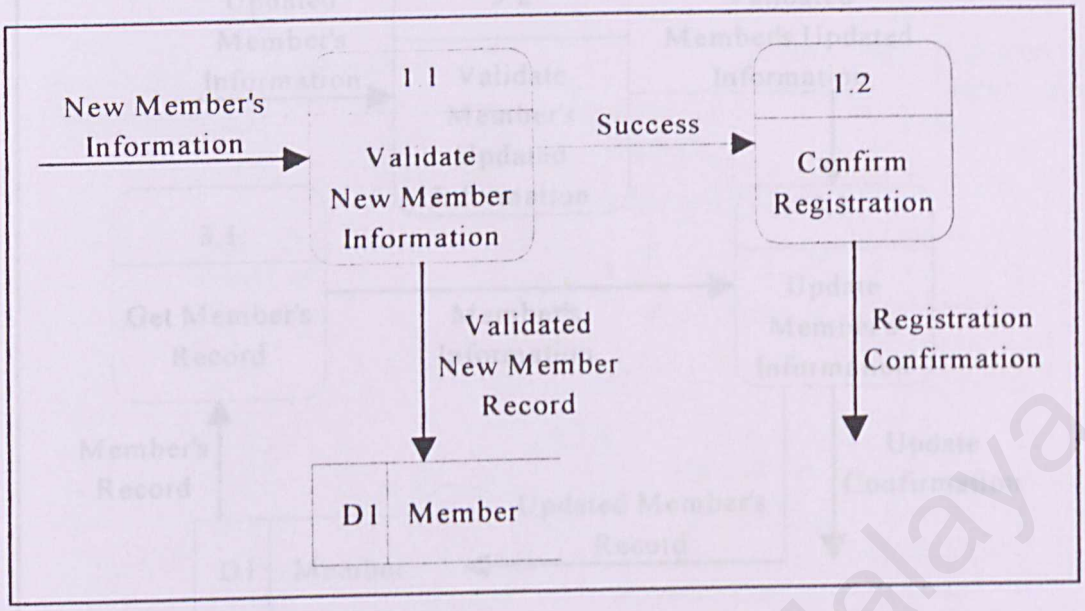


Figure 3.12: DFD for Registration

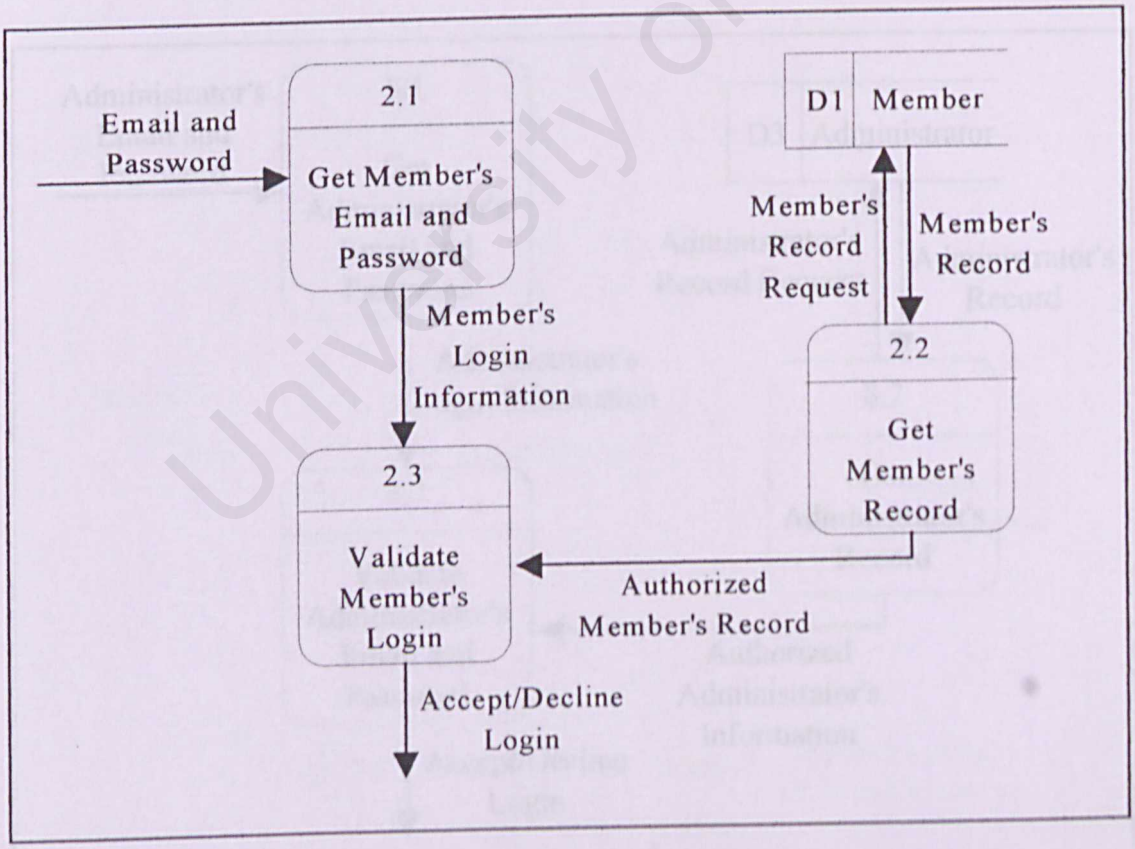


Figure 3.13: DFD for Member Login

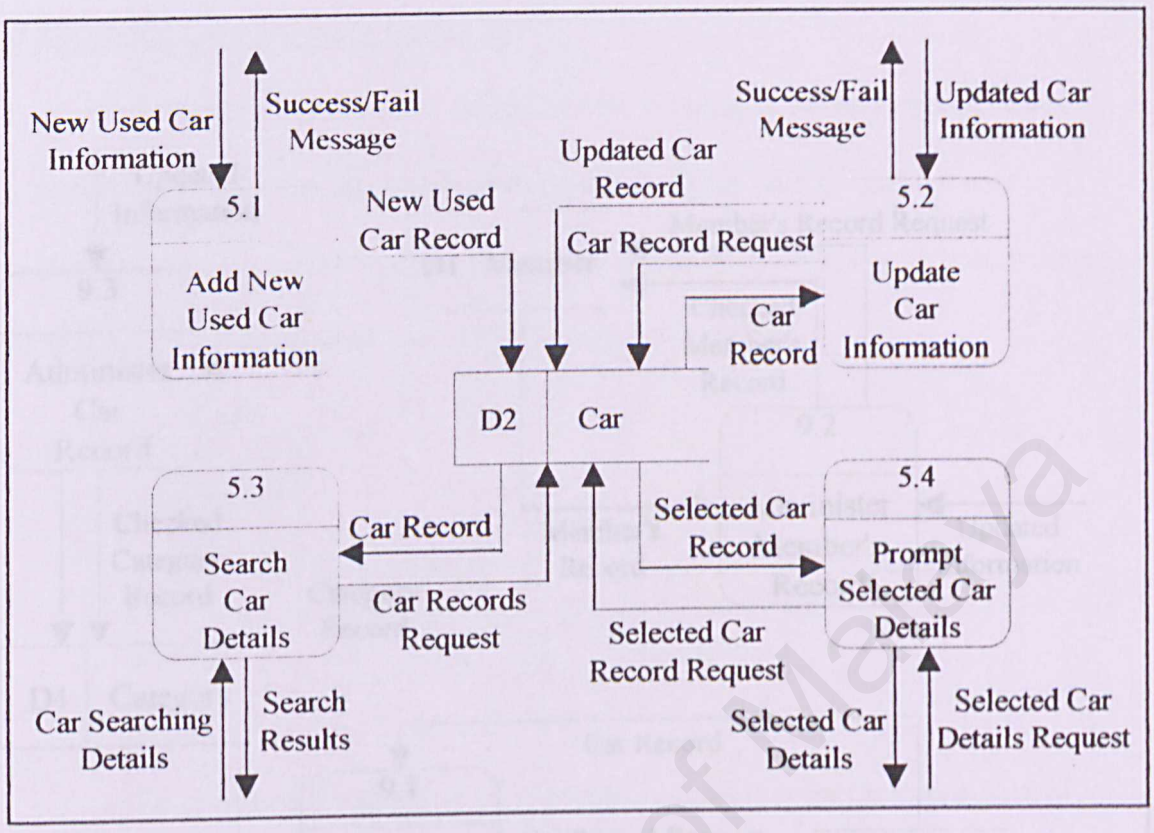


Figure 3.16: DFD for Manage Car Information

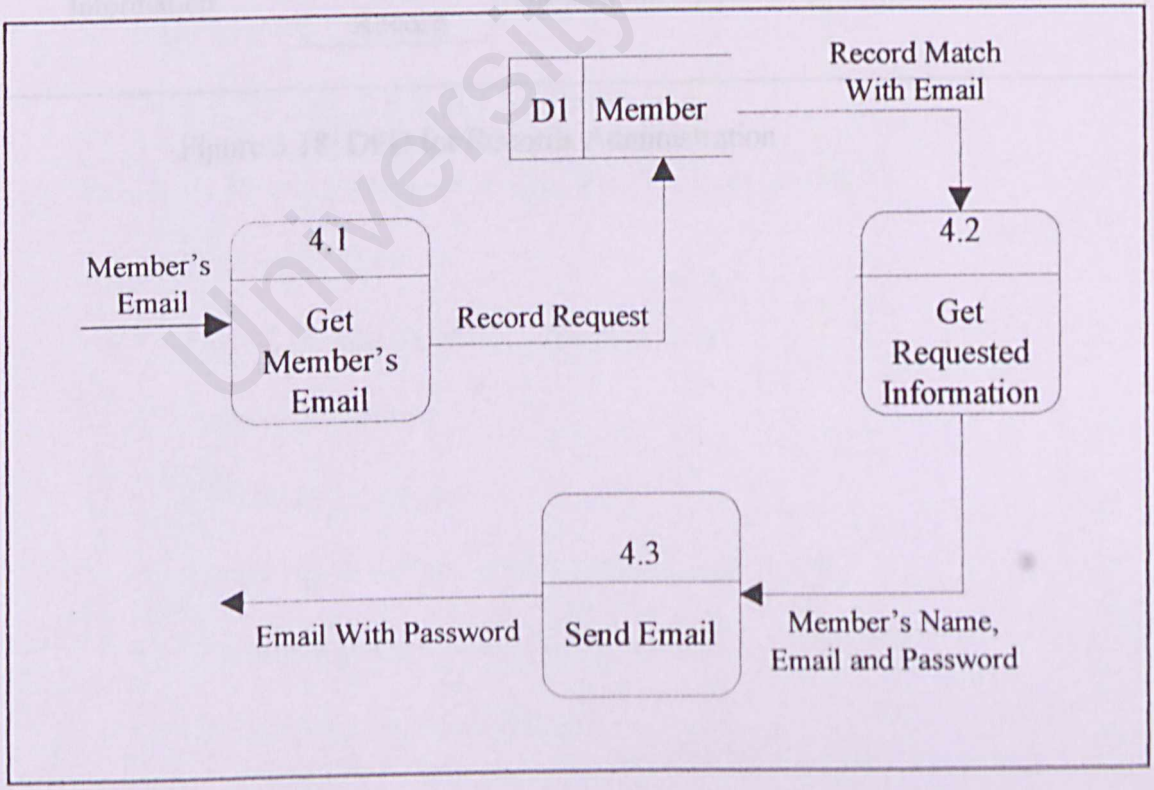


Figure 3.17: DFD for Forgot Password

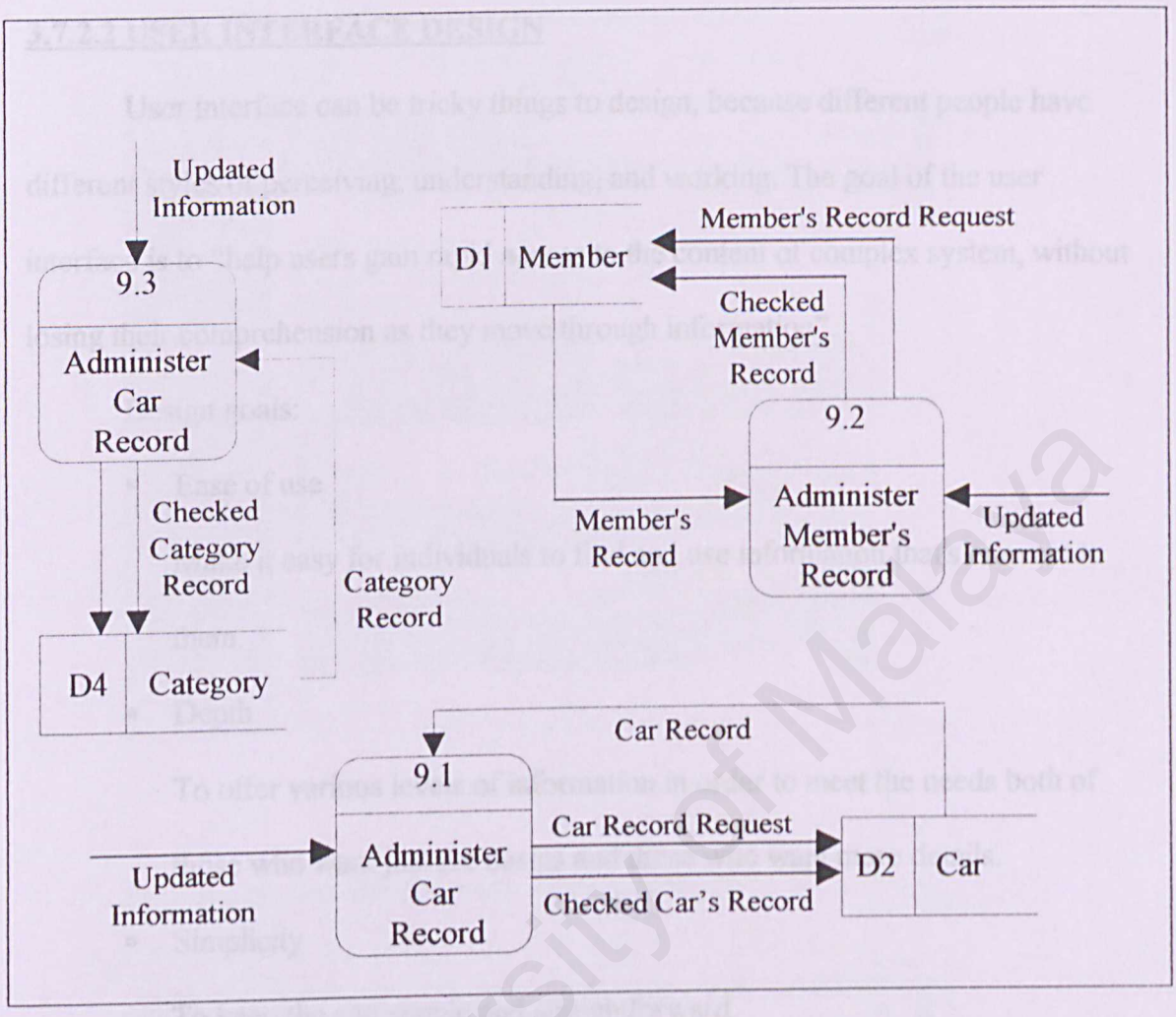


Figure 3.18: DFD for Records Administration

3.7.2.2 USER INTERFACE DESIGN

User interface can be tricky things to design, because different people have different styles of perceiving, understanding, and working. The goal of the user interface is to "help users gain rapid access to the content of complex system, without losing their comprehension as they move through information".

Design goals:

- Ease of use

  Make it easy for individuals to find and use information that's relevant to them.

- Depth

  To offer various levels of information in order to meet the needs both of those who want just the basics and those who want more details.

- Simplicity

  To keep the site simple and straightforward.

Below are several guidelines for designing forms or reports:

- Meaningful title
- Logical grouping and sequencing of fields
- Familiar field labels
- Consistent use of colour
- Visible space and boundaries for data entry fields
- Error messages for unacceptable values
- Optional fields marked clearly

Figure 3.19: Home Page

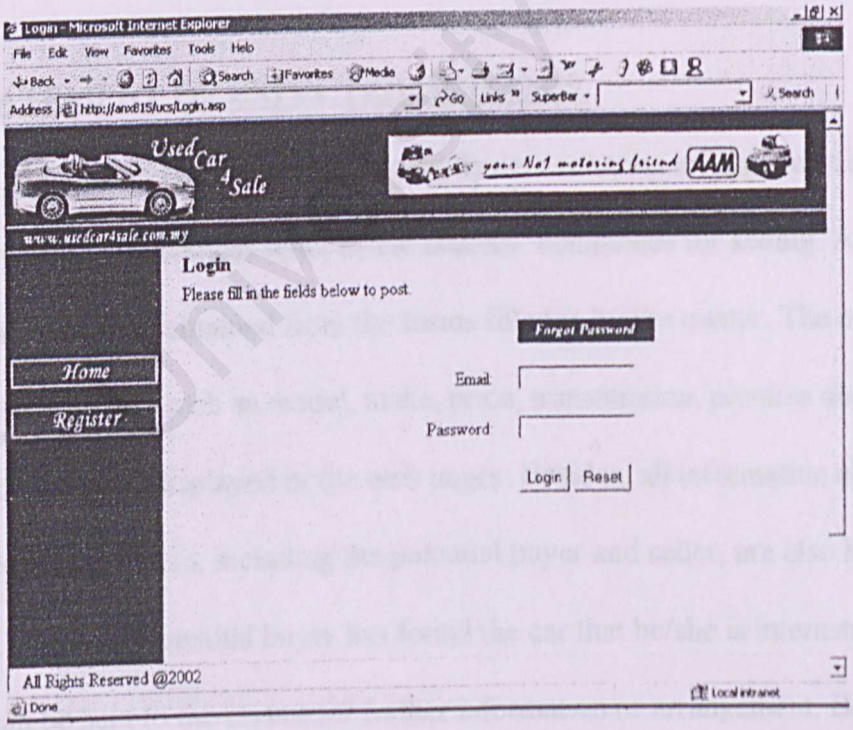


Figure 3.20: Login Page

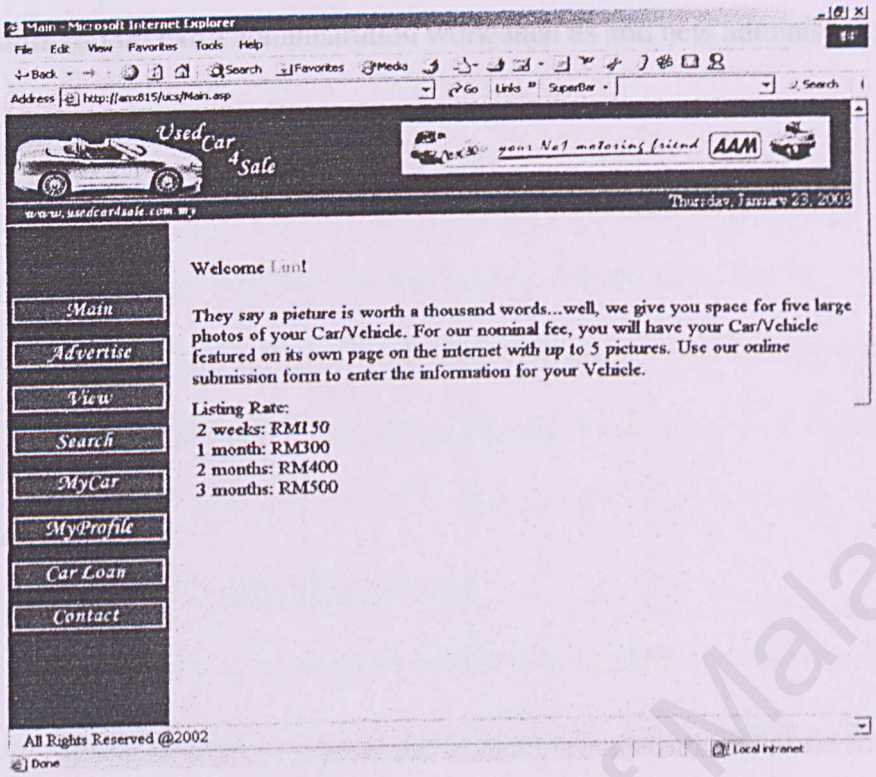


Figure 3.21: Main Page

3.8 STATEMENT OF EXPECTED OUTCOME

The Online Used Car Advertising System contains information about used car advertised by personal seller or car dealers' companies for selling. All information will be obtained from the forms filled in by the owner. The information will include details such as model, make, price, transmission, pictures and etc. All of this information is displayed in the web pages. Besides, all information about the member of the system, including the potential buyer and seller, are also kept in the system. Once the potential buyer has found the car that he/she is interested in, an email can be sent to the owner for further information or arrangement. Besides, the system also contains an administrator module where administrator can administer all

the records and do extra administration work such as add new administrator of the system.

CHAPTER 4: SYSTEM IMPLEMENTATION

4.1 INTRODUCTION

System implementation is a process that converts the system requirements and designs into program codes. For this system, the processes that involve start from the installation and set up of the Web Server and the required software and hardware till the coding of the modules and finally the integration of all modules.

4.2 DEVELOPMENT ENVIRONMENT

Development environment has certain impact on the development of a system. Using the suitable hardware and software will help to speed up the system development and determine the success of the project. Therefore, the hardware and software chosen to develop the system are critical.

4.2.1 HARDWARE USED

The hardware used to develop the system are as listed:

- Intel Pentium III 550MHz Processor
- 10GB Hard Disk
- 128MB RAM
- Other standard PC components

4.2.2 SOFTWARE USED

4.2.2.1 TOOLS FOR SYSTEM DOCUMENTATION

For the system documentation, Microsoft Word 2000, Microsoft Visio 2000 and Adobe Photoshop 6.0 are used to draw the structure charts, DFD, flow charts, and to do the report writing and user manual documentation.

4.2.2.2 TOOLS FOR SYSTEM DEVELOPMENT

The chosen of the development tools are important in determining the usability of the entire system. Below is the list of the software/software tools used during the development of the system:

Table 4.1: Summary of software/software tools used

Software/Software Tools	Description
Microsoft Windows 2000 Professional	Operating System
IIS (Internet Information Server)	Web Server
Microsoft SQL Server 2000	Database Server & Application
ASP (Active Server Pages)	Server-side Scripting
JavaScript, VBScript, HTML	Client-side Scripting
Internet Explorer 4.0 or above Netscape Communicator 4.0 or above	Web Browser
Macromedia Dreamweaver UltraDev 4.0, Microsoft Visual Interdev 6.0	Coding web pages
Adobe Photoshop 6.0	Image design and creation
Persits Software AspEmail	Send email
Asp SmartUpload	Upload images

4.3 SYSTEM DEVELOPMENT

The Online Used Car Advertising System is developed using a modular approach where each module is developed separately and are integrated later into a fully functional system. For each module, it is further refined into functions and procedures. By using a modular approach, future modifications and enhancements can be made easily.

4.3.1 WEB PAGES CODING/SCRIPTING

Coding the program is the process of writing the program instruction that implements the program design. If design is performed in detailed manner, then the coding can be accomplished easily. There are two types of scripting, which are client-side scripting and server-side scripting. For the client-side scripting, they must be delimited by the <SCRIPT>…</SCRIPT> tags. On the other hand, server-side scripting is using the script delimiters <% and %>. Any text enclosed within these delimiters will be processed as a script.

4.3.1.1 CODING APPROACH

The Online Used Car Advertising System is coded using the top-down hierarchical approach and modular programming approach.

The top-down hierarchical approach is an approach that is suitable to be implement of well-structured program. This approach is adapted due to the dependency of the login function before the member of the system can use most of the function. First, the home page is created and then the others modules are created and subsequently sub-modules are created.

The modular approach is a method where each single module is developed separately with distinct functions. When each module is complete, then the related modules are integrated into a fully functional system with suitable interfaces.

4.3.1.2 CODING STYLE

Coding style is an important attribute of source code and it determines the intelligibility of a program. An easy to read source code makes the system easier to maintain and enhance. The element of coding style includes internal (source code level) documentation, method for data declaration, code indentation and the sequence of the codes.

- Internal Documentation

  The comments written in the code can helps the user of the program to understand the code easily. This can provide a clear guide during the maintenance or enhancement of the system.

- Method for data declaration

  A standard and meaningful data declaration method can help programmer to understand the code easily.

- Code indentation

  The indentation can make the code more clearly and structured.

- Sequence of the code

  A standard or familiar method of the sequence of code writing, for instance, start with ASP code with the connection to database and variable declaration, follow by the JavaScript and finally the HTML. Standardization makes the code easier to understand.

4.3.1.3 SERVER SIDE SCRIPTING

As mention above, ASP, which is used to develop the Online Used Car Advertising System is a server-side script and located within the delimiters <% ...

%>. It is invisible to the client and is executed in the server. Hence ASP is suitable to be employed in the Online Used Car Advertising System and produce consistent result regardless of the browser used. Some of the ASP objects used in the development of this system are:

- Request Object
- Response Object
- Session Object

4.3.1.4 CLIENT SIDE SCRIPTING

JavaScript and HTML are also used to develop the Online Used Car Advertising System. They are client-side scripting. JavaScript is located within the delimiters, <script language="JavaScript"> and </script>. It is usually used to do the form validation such as date validation, to ensure the type of the input data is correct and many others useful functions.

4.3.2 DATABASE DEVELOPMENT AND CONNECTION

The database for Online Used Car Advertising is created using Microsoft SQL Server 2000. After the SQL Server has successfully installed, the SQL Server Enterprise Manager is used to create tables. Creating and modifying tables can be made easily.

Active Data Object (ADO) is used to store and retrieve data from a database. Before ADO can be used, a connection string has to be specified. The string contains the driver name, server name, user id, user password and database name. All these

information have to be specified in order to make a connection to the database. The string is written as follow:

```
<% Dim ConnectionString
ConnectionString = "Extended Properties=DRIVER=SQL Server;
SERVER=Server_name;UID=User_id;password=User_password;
DATABASE=Database_name" %>
```

All communication with a database takes place through an open connection. Before any information can be inserted into or retrieved from the database, a connection with the database must be opened. Using the Open method to open the connection and close the connection using the Close method.

4.3.3 INTERFACE DEVELOPMENT

To create images, Adobe Photoshop 6.0 was used. Beside that, Macromedia Dreamweaver UltraDev 4.0 also helps in web page layout design.

4.3.4 IMAGES UPLOADING

ASP SmartUpload was used to enable users to upload and store their car images into the Online Used Car Advertising System database. All images uploaded by users will be store in a folder name "image". Inside that folder, the images will be store according to the "owner-id" (the member id of the car owner) and then according to the "car-id" (the id of the car). The filename of the images will be store in the fields prepared in the "Car_Info" table. Users are allow to browse and then

select the image that they want to upload. Setting about the size and file type of image allowed can be done by writing a few lines of code.

4.3.5 SENDING EMAIL

Persits ASPEmail was used to enable users to send email to the administrator of the system or to the owner of the car that they are interested in without using the Microsoft Outlook.

4.4 SUMMARY

This chapter defines the implementation of the system. It contains the actual tools, method and technique that are used to implement the system. The focus of this chapter is the hardware and software used, coding approach and style, database connection and the software tools that are used to implement other functions in the system.

CHAPTER 5: SYSTEM TESTING

5.1 INTRODUCTION

No matter how we write programs, it is obvious that from the variety of errors that are possible, we should check that our modules have functioned correctly. Testing is performed to ensure that the programs are executed correctly and to detect the existence of errors. It provides a method to correct logic error and for testing system reliability. Testing is a verification and validation process. Verification ensures the system implements a specific function correctly, whereas validation ensures the system has been built traceable to user requirements.

The objective of testing is:

- Executing a program with the intention of finding error that makes the program fail.
- Test a program to demonstrate the existence of a fault.

Fault identification is the process of determining what fault or faults caused the failure, and fault correction or removal is the process of making changes to the system so the faults are removed.

In order to perform a good test on the system, an independent test team is used to test the system. In this way, conflict between personal responsibility for faults and the need to discover as many faults as possible can be avoided. The independent test team of Online Used Car Advertising System is consists of course mates of the developer, supervisor and friends that are not familiar with coding.

5.2 TESTING STRATEGIES

A testing strategy is a general approach to the testing process rather than a method of devising particular system or unit test.

The testing strategies include:

- Top-down testing

  Testing starts with the most abstract component and works downwards.

- Bottom-up testing

  Testing starts with the fundamental components and works upwards.

- Thread testing

  Is used for systems with multiple processes where the processing of transaction threads its way through these processes.

- Stress testing

  Relies on stressing the system by going beyond its specified limits and hence testing how well the system can cope with overload situations.

- Back-to-back testing

  Is used when versions of a system are available. The systems are tested together and their outputs are compared.

5.3 TESTING STEPS

Testing steps for the Online Used Car Advertising System consists of three steps as shown in figure below:

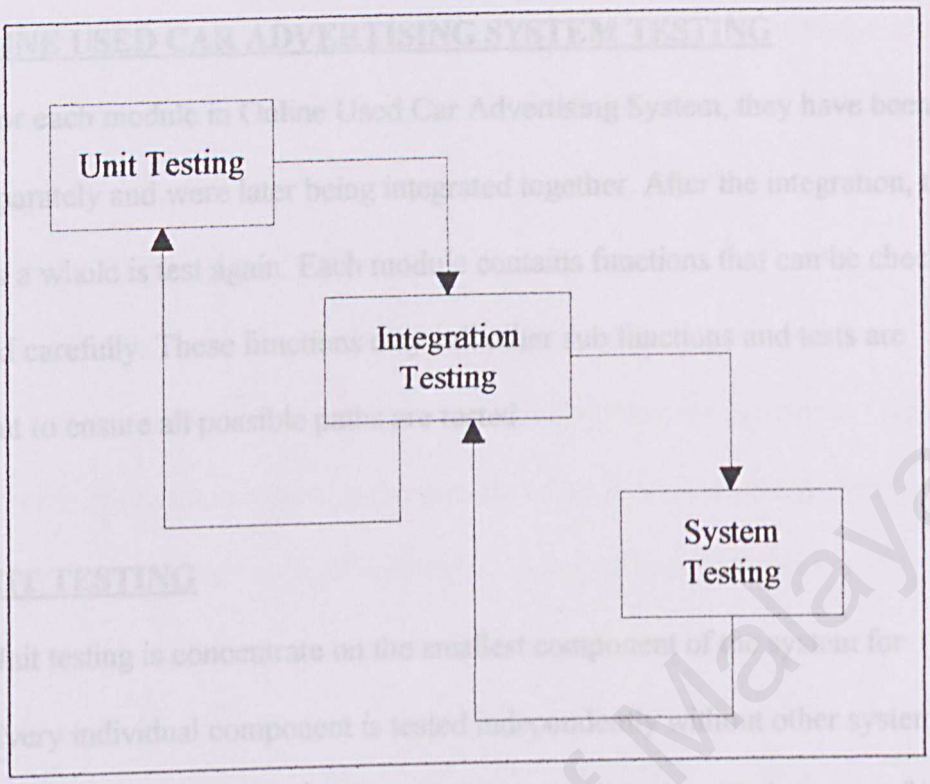


Figure 5.1: Testing Steps

The sequence of testing activities is unit testing, integration testing and system testing. Basically the system testing, is consists of function test, performance test, acceptance test and installation test. In the unit and integration testing, components are tested and then merged into a layer, working system. But in the system testing, the system is viewed and tested as a whole, rather than as separate pieces.

As defects are discovered at any stage, program modifications are required to correct them and this may require other stages in the testing process to be repeated. The process is therefore an iterative process with information being get back from later stages to earlier parts of the process.

5.4 ONLINE USED CAR ADVERTISING SYSTEM TESTING

For each module in Online Used Car Advertising System, they have been tested separately and were later being integrated together. After the integration, the system as a whole is test again. Each module contains functions that can be checked and tested carefully. These functions may call other sub functions and tests are carried out to ensure all possible paths are tested.

5.4.1 UNIT TESTING

Unit testing is concentrate on the smallest component of the system for testing. Every individual component is tested independently without other system components. It verifies that the component functions properly with the types of input expected from studying the component's design. This process enables the tester to detect errors in coding and logical mistakes.

The first step is to examine the program code by reading through it, trying to spot algorithm, data and syntax faults. This is followed by comparing the code with specifications and with the design to make sure that all the relevant cases have been considered. Finally, test cases are developed to show that the input is properly converted to the desired output.

For Online Used Car Advertising System, unit testing is done concurrently with the development phases. For example, the car advertising module has a sub-module which is to upload the images by member of the system. This sub-module is further divided to many functions such as create folder, store images and update fields in database table. Each of these functions are reviewed and checked separately.

Then the sub-module is tested to ensure it functions are desired. After all the sub-modules have been tested, the module will be inspected and tested as a whole.

5.4.2 INTEGRATION TESTING

When the individual components are working correctly and meet the objectives and requirement, these components are combined into a working system. In other words, integration system is the process of verifying that the system components work together as described in the system and program design specifications. Testing the interface of two components explores how components interact with each other.

For Online Used Car Advertising System, a bottom-up approach has been used. Each component at the lowest level of the system hierarchy is tested individually first. Then, the next components to be tested are those that call the previously tested ones. This approach is followed repeatedly until all modules are included in the testing.

This bottom-up method is useful and suitable for this Online Used Car Advertising System since the system is integrating quite a number of stand-alone reused components. Since the system is developed modularly, errors found should be corrected in each module easily.

5.4.3 SYSTEM TESTING

The last testing step is the system testing. Testing the system is very different from unit and integration testing. The objective of system testing is to ensure that the system does what the customer wants it to do.

There are several steps in testing a system:

- Function Testing

  Checks that the integrated system performs its functions as specified in the requirements. For example, a function test of a car advertising function verifies that the function can correctly store the information of a car, check the existence of the specific folder, create a folder and store the images.

- Performance Testing

  Compares the integrated components with the nonfunctional system requirements. These requirements, including accuracy, speed, reliability, and security, constrain the way in which the system functions are performed. For instance, a performance test of the car advertising evaluates the speed with which images are stored, the precision of the folder creation and the response time to user.

- Acceptance Testing

  Assures the customers that the system they requested is the system that was built for them. The customers will test the system, making sure that it meets their understanding of the requirements, which may different from the developers.

- Installation Testing

Allow users to exercise system functions and document additional problems that result from being at the actual site.

5.5 ANALYSIS OF THE TESTING

From the testing process that has been carried out, the test results are summarized as below:

- Achieve the main objective of the project

  Generally, the main objective of the project as described earlier has been achieved. The system is able to add, update and delete records in database, can upload images, send email, search cars, view cars by category and etc. The administration module is also able to manage all the records of member, car, category and administrator.

- Attractive and user-friendly user interface

  The user interface can be more attractive in order to attract user. Bright colour and more attractive icons should be used.

- Completeness of the car information

  Since the objective of this system is to eliminate problems such as traveling cost, the car information provided must be clear and enough. Adding few more features to describe the car is a good way to enhance the system.

5.6 SYSTEM TESTING CHECKLIST

Table 5.1: Testing Checklist

Module/ Sub Module	Expected Result	Actual Result	Remarks
User Register	Check data validation. Insert data into database and show success message. Pop-up error message if data not valid.	If data are valid then record is added into database and success message is shown. If data are not valid, error message pop-up.	This module is considered correct and done.
User Login	Check the email and password. If match with database record then redirect to the main page. If no record is match then show error message.	If record is match then redirect to the main page. If no record is match, error message is shown.	This module is considered correct and done.
User Forgot Password	Search a record, which match the user email. If record is found, an email will be send to the user. A success message is shown. If no record is match then show error message.	If record is match then an email contain the password is send to the user. A success message is shown. If no record is match, an error message is shown.	This module is considered correct and done.
Advertise Car	Check data validation. Insert data into database and show success message. Pop-up error message if data not valid.	If data are valid then record is added into database and success message is shown. If data are not valid, error message will pop-up.	This module is considered correct and done.
Upload Image	Check image size and type. Check existence of folder and store image in the folder.	If image size and type are correct and folder is exist then store image. If the folder is not exist then a folder will be created and image will be stored.	This module is considered correct and done.

Show Car Information	The record of the selected car is get from the database and show to the user.	Correct record is get from the database and shown in the correct format.	This module is considered correct and done.
Car Searching	Search for car record according to the criteria get from the search form.	Correct records are get from the database and shown in the correct format.	This module is considered correct and done.
Car and User Profile Editing	Check data validation. Updated information will be inserted into the database and show success message. Pop-up error message if data not valid.	If data are valid then information is updated into database and success message is shown. If data are not valid, error message will pop-up.	This module is considered correct and done.
Loan Calculation	Monthly repayment will be calculated according to the loan amount and loan term.	Correct monthly repayment is calculated.	This module is considered correct and done.
Send Email	Email will be send to the correct person with the correct information.	Email is sent to the correct person with the correct information.	This module is considered correct.

CHAPTER 6: SYSTEM EVALUATION

6.1 INTRODUCTION

During the development process, many problems were encountered and solutions were sought to solve those problems. Besides, the system strengths and limitations are evaluated from time to time. Hence, the future enhancement of the system can be identified.

6.2 PROBLEMS ENCOUNTERED AND THEIR SOLUTIONS

Research and studies in fields such as Internet, File System Object (FSO), SQL and programming concepts are important to build a web-based system. The following are some of the major problems encountered from the beginning to the completion of the system development.

6.2.1 DIFFICULTIES IN CHOOSING A DEVELOPMENT TECHNOLOGY AND PROGRAMMING LANGUAGE

There are many software tools available to develop a web-based database system currently. Choosing a suitable technology and tool was a critical process as all tools have their strengths and weaknesses. In addition, the availability of the required tool for development was also a major consideration. A tough decision was needed to choose from Active Server Page (ASP), ASP.Net or Java Server Page (JSP).

Besides, decision is also needed to choose a suitable operating system, web server and database server. Choices of operating system are Windows 98 and

Windows 2000. Personal Web Server (PWS) and Internet Information Server (IIS) are choices for web server while choices of database server is Microsoft Access of Microsoft SQL Server 2000. All those tools are interrelated and so decision must be made carefully.

In order to solve all these problems, seeking advises and views from course mates, friends and even seniors who had experience in similar project were carried out. As a result, Windows 2000, IIS, Microsoft SQL Server 2000 and ASP have been chosen to be used to develop the Online Used Car Advertising System.

6.2.2 DETERMINING SCOPE OF THE SYSTEM

It is difficult to build a full-scale and complete system within the given time frame. Inexperience with the current car advertising and selling system in the real world was another obstacle to implement true workable system since the online car advertising system is not so popular in Malaysia.

Many researches, studies and discussions with project supervisor were held to outline the scope of the project to be built during the initial stages.

6.2.3 INEXPERIENCE IN THE CHOSEN PROGRAMMING LANGUAGE

Since there was no prior knowledge of programming in ASP, JavaScript and HTML, there was an uncertainty on how to organize the codes in a web page. These programming languages and concepts were never taught before and is totally different from what have been taught in lab exercises of the programming courses

that have been taken. Implement such an application requires a fair grasp of the language.

Although I use many efforts to learn the new technology, choosing to program in ASP is a wise decision. The learning curve was short, functions stated in the requirement can be implemented and the problems faced were manageable by doing research on related materials and through discussion with course mates using same technology. Trial and error method is also very useful during coding phase.

6.2.4 DIFFICULTIES IN CHOOSING THE SOFTWARE TOOLS

For the upload image and send email function, consideration of the software tools needed to make the function works must be made. For example, the Persits AspEmail and ASP SmartUpload has been chosen since both can be download from Internet and it is free. But to use the Persits AspEmail, the SendToQueue method cannot be used since it requires the EmailAgent service to be running which is a premium feature.

Besides, the dll (dynamic link library) need to be register in order to use both AspEmail and ASP SmartUpload. Although this is not a very tough work, but it still need some studies in order to know how to make it works. Related information has been search and get from the Internet to learn how to register and use those two software tools.

6.3 SYSTEM STRENGTHS

There are some strengths in the Online Used Car Advertising System. Below are the strengths:

- Friendly User Interface

  The system has a friendly user interface that is easy to use. GUI components such as command buttons, radio buttons, check boxes and drop-down list boxes are used to attract the users to navigate the system. The users are requested only minimum amount of typing and inputs when having any interaction with the system. Besides, sufficient instruction and guidance are provided to assist the users. For example, pop-up error messages will be displayed to guide users whenever they key in invalid input. The learning curve is foreseen to be short and a user should be able to use the system with ease within minutes.

- Easy Accessibility

  The Online Used Car Advertising System is a web-based application and so it can be accessed easily using the web browser. The web browser needed especially Internet Explorer 4.0 could be downloaded free from Microsoft's Website.

- Effective Error Handling

  Inputs by the users are validated before the data are insert to the database. This is used to filter out erroneous data such as invalid data type and to ensure the data consistency or integrity for the system. For example, the date will be checked to make sure it is a valid date.

- Error Messaging

In Online Used Car Advertising System, the error messages will be displayed whenever the system found that the data key-in by users is not correct. This enables users to identify and correct the errors effectively. Besides, some error messages are shown in red colour that can attract the users' attention easily.

- Custom Password System

  Creating a custom password-authentication system prevents unauthorized users from viewing pages that they do not have permission to access. More importantly, unauthorized users are prohibited from changing the data stored in the database.

- Search Capability

  The system provides search capability that allows users to search for a particular type of car with specified criteria. This will save users' time without the need to browse through all the cars advertised in the system.

- Systematic Upload Function

  Users are allowed to upload up to five pictures. The pictures that are uploaded by the users are kept in the image folder and according to their user id and car id. This is good since it allows administrator to keep track the images easily.

- Able To Provide Database Maintenance

  Administrators are able to do the maintenance of the records in the database, such as add, update, delete and view all the records.

- Mailing Service

The Online Used Car Advertising System has provided the send email facility. The users may use this function to contact with the owner of the car that they are interested in or even send an email to the administrator if they need to ask something of the system. Besides, they also can get their password through email send by the system if they forgot their password.

- Relatively Fast Response Time For Document Retrieval

  The web pages are designed in such a manner that they are loaded in a reasonable amount of time to ensure that the users need not to wait too long to view the pages. For example, when the user views the information of the car, all five pictures are shown in smaller size but user can click on the picture in order to view the larger picture in the pop-up window.

- Transparency

  The system is transparency to the user, as they do not need to know where the database resides, how the system is structured and etc. For example, users do not need to know how the images are uploaded and stored, what they need to do is click to browse to the images that they want to upload.

6.4 SYSTEM LIMITATIONS

There are some limitations in the Online Used Car Advertising System due to the time constraint, facilities constraint and others undesirable reason.

Below are the limitations:

- Lack Of Security Features

No encryption of administrators and members' password in the database. A systematic encryption algorithm should be used to implement in the system.

- Lack Of Online Help

  No online help facility is provided. Users can only send email to the administrator of the system if they have any problems or uncertainties about the system.

- Image Size Limitation

  Since every car can be advertised with up to five pictures, the size of every image is not allowed to exceed 50000 bytes. This is to ensure that the server, which contains the system, has enough capacity of the memory to store the images.

6.5 FUTURE ENHANCEMENT

Some of the future enhancements that can be considered to be included in the Online Used Car Advertising System are:

- Send Email Automatically

  The system will send an email to the owner of the car which is still advertise in the website and will reach the end of the advertise duration soon. The email will be send about 1 week before the car advertisement expired date to alert the owner and ask whether they want to continue the advertisement.

- Allow Online Payment

The system will support online payment. It is desirable that payment can be done online so that the advertising process can be started immediately after the users do the payment.

- Enhance Security Of The System

  Enable administrators and members' password encryption.

- Provide Additional Services

  Provide additional online services such as banking services, car loan guides and information about car maintenance.

- "Add To Favorites" Function

  The system will allows users to set several cars as their favorite cars. This is useful when the users have not decided yet which car they want to choose among several cars. This method will allow them to view the information about those selected cars easily once they login to the system.

6.6 SUMMARY

The system had been evaluated after the testing phase. The criteria that have been taken into consideration for the evaluation process are problems encountered, system strengths, limitations and future enhancement. This enable the developer to know the weaknesses and strengths of the system and new features that need to be added in order to make the system more useful and suitable.

6.7 CONCLUSION

Overall, the Online Used Car Advertising System has achieved and fulfilled the objectives and requirements as a web-based car advertising system.

A lot of knowledge was gained throughout the development of the system. These include knowledge in setting up the Microsoft SQL Server, Internet technologies and programming. Programming in ASP, HTML and JavaScript proved to be a valuable experience. Furthermore, the development of this system also provides the opportunity to master the development software such as Macromedia Dreamweaver Ultradev, Microsoft Visual Interdev, Adobe Photoshop and etc. Therefore, the final year project is utmost encouraged.

APPENDIX A: DEVELOPMENT SCHEDULE

Development Schedule

Used Car Sale System Development Schedule (Jun 2002 – Feb 2003)									
Activities	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
PHASE 1									
Introduction									
Literature Review									
System Analysis									
System Design									
PHASE 2									
System Coding									
System Testing									
System Documentation									

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CHAPTER 1: INTRODUCTION

1.1 WELCOME

This document is the User Manual for Online Used Car Advertising System. It is a web-based application, which is developed with the objectives of utilizing the computer and information technology to provide an easy, and convenient online car searching or car advertising in Malaysia.

It consists of two sections, namely the user section and the administrator section. User section can be divided into two parts, namely the member and the non-member section.

Online Used Car Advertising System is easy to use, all the functions in this system is meaningfully descriptive and can easily be executed by a simple point and click on the available function button and hypertext link.

1.2 ABOUT THIS MANUAL

This user manual will guide you through all the function available in the system. This manual includes the following parts:

- User section guides
    - Non-Member section guides
    - Member section guides
- Administrator section guides

CHAPTER 2: HARDWARE AND SOFTWARE REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

Server:

Minimum Intel Pentium 450 MHz

Minimum 128 Mb RAM

Hard disk 10 GB or above

Keyboard and Mouse as input devices

Workstation:

Standard PC which support online which included modem

2.2 SOFTWARE REQUIREMENTS

Server:

Microsoft Windows 2000 Professional

IIS (Internet Information Server)

Microsoft SQL Server 2000

Workstation:

Microsoft Window 98, 2000, ME

Internet Explorer 4.0 or above or Netscape Communicator 4.5 or above

CHAPTER 3: USER SECTION

The following section will describe all the functions in the user section of Online Used Car Advertising System. This user section can be divided into two parts:

- Non-Member section
- Member section

3.1 NON-MEMBER SECTION

The non-member section has two modules, which are Registration module and Car Information module. Each of the modules has its functions or procedures that play their own part respectively.

3.1.1 REGISTRATION MODULE

The registration module will allow non-member to fill in a form and register to be a member of the system. To enter to the register page, users need to click the register button in the home page.

3.1.1.1 Home Page

The home page is the first page that all the users will come to. In this page, the actions that the non-member can take are:

- Click the register button to go to the register page
- Click on the car picture to view the information of the car

Figure 3.1: Home Page

3.1.1.2 Register Page

Here is where the non-member can register to be a member so that they can use all the facilities provided by the system. Non-member can key-in their details and those fields marks * are required fields. There will be a data validation checking function where a error message will pop-up immediately if the data key-in by the user is not valid after the user click the submit button. If the registration process is successful, it will redirect to the login page.

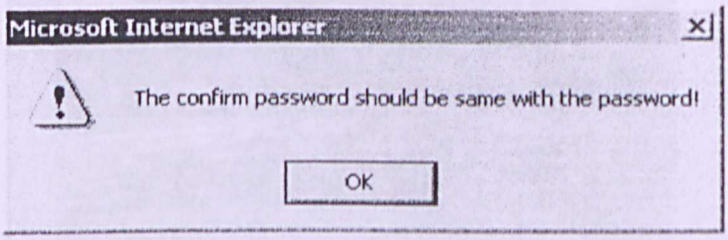

Figure 3.2: Error message

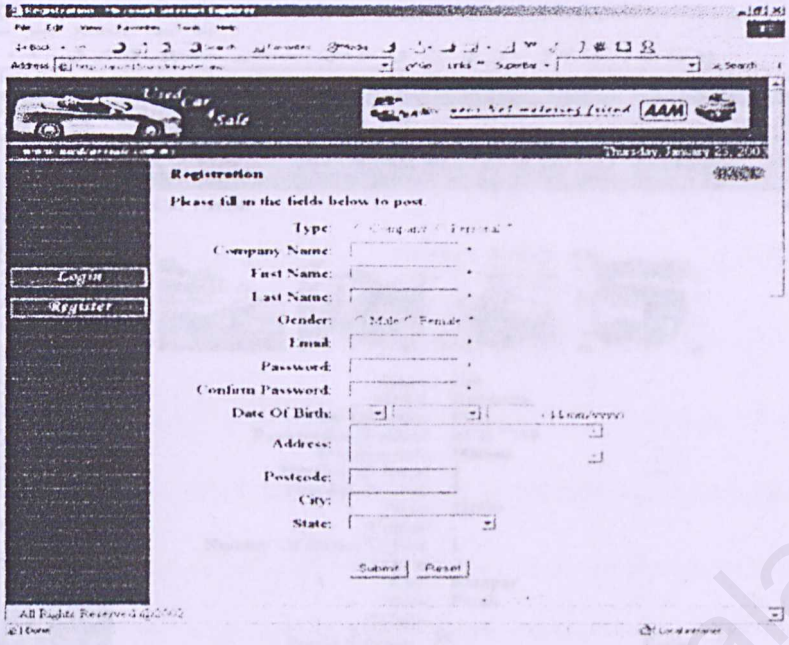

Figure 3.3: Register page

3.1.2 CAR INFORMATION MODULE

The objective of the car information module is to allow users to view the details of the cars that are advertised in the website.

3.1.2.1 Car Details Page

This is the page where the user will come to if they click on the car picture. All the information of the car include the pictures are shown. Those car pictures can be shown in larger size in the pop-up window when the user clicks on it.

Figure 3.4: Car pop-up window

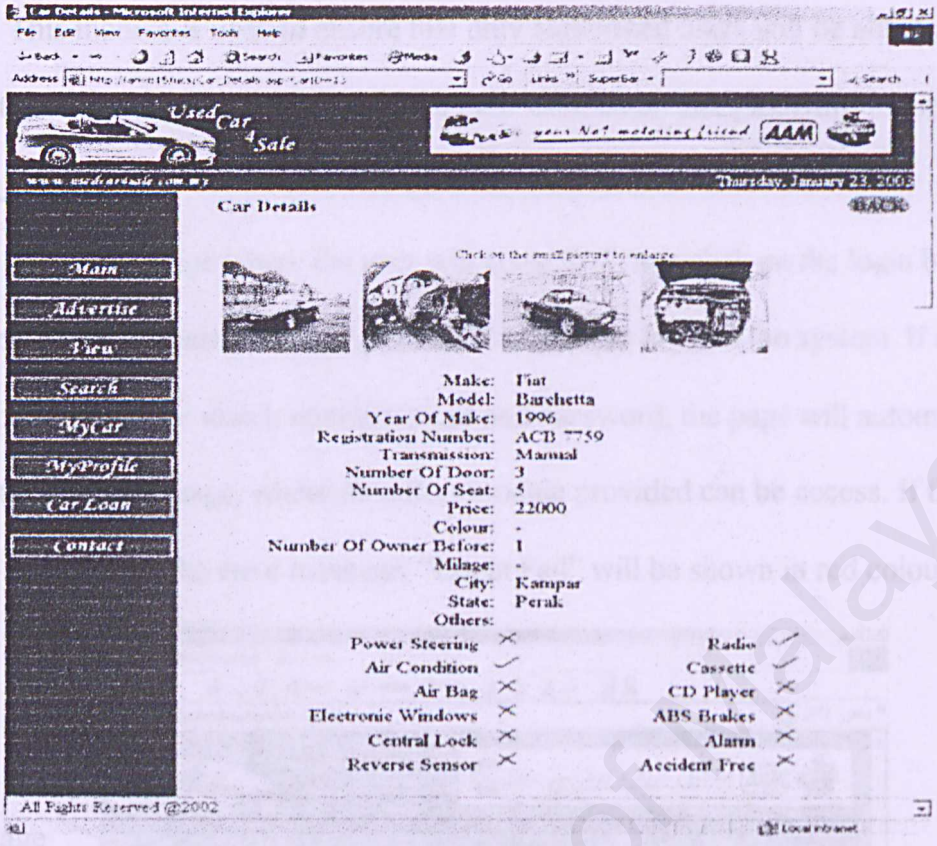

Figure 3.5: Car Details Page

For this page, non-member can just see the information of the car, but if a member who already login and come to the car details page, the member can also see the "send email to owner" button, which will redirect them to the send email page.

3.2 MEMBER SECTION

The member section has 10 modules, which are Login Module, Forgot Password Module, Vehicle Advertise Module, Car Information Module, Email Module, Search Module, Vehicle Editing Module, Profile Editing Module, Loan Calculation Module and Contact Module.

3.2.1 LOGIN MODULE

This module is used to ensure that only authorized users will be able to get into the system. The authorized users will use their valid email and password to login.

3.2.1.1 Login Page

This is the page where the user will come to if they click on the login button User need to enter their email and password in order to login to the system. If the record get from database are match with the email and password, the page will automatically redirect to the main page, where all others module provided can be access. If the records are not match, then the error message, "Login Fail" will be shown in red colour.

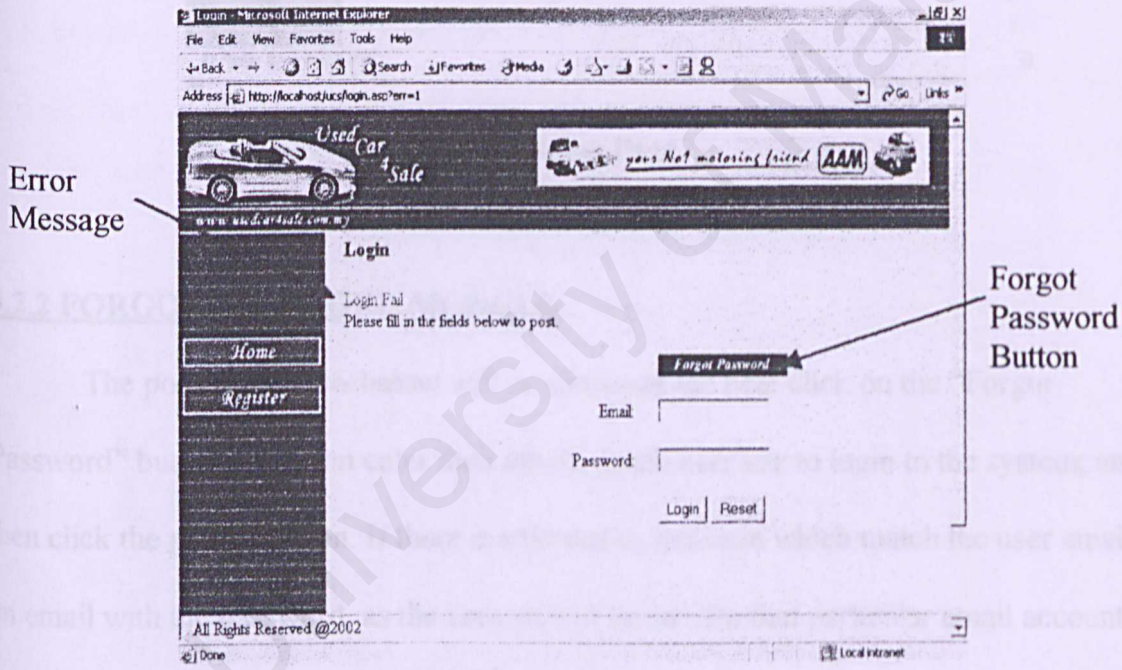

Figure 3.6: Login Page

3.2.1.2 Main Page

Figure 3.7 shows the main page that the member will come to after their login process is success. The advertising rate and others related information would be shown. At the left hand side, there is a list of functions that the system provides for the member. Click on any of those buttons will redirect member to another page for the particular function.

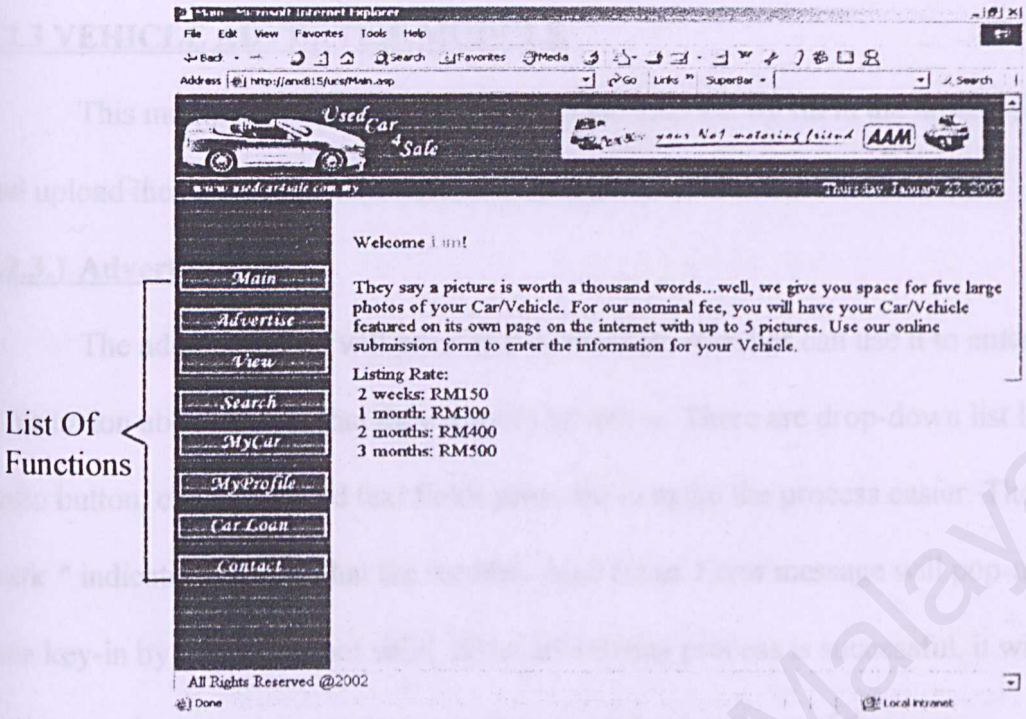

Figure 3.7: Main Page

3.2.2 FORGOT PASSWORD MODULE

The pop-up window below will be shown as the user click on the "Forgot Password" button. User can enter their email, which user use to login to the system, and then click the submit button. If there is a record in database which match the user email, an email with the password, as the content will be send to that particular email account. This function enables member who forgot their password to get back their password.

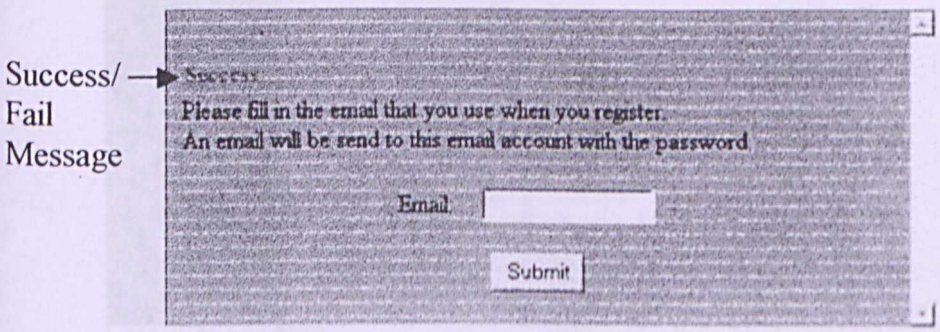

Figure 3.8: Forgot Password Pop-Up Window

3.2.3 VEHICLE ADVERTISE MODULE

This module enables member to advertise their car by fill in the advertising form and upload the car pictures.

3.2.3.1 Advertise Page

The advertise page will provide a form where member can use it to enter all the information about the car that they want to advertise. There are drop-down list boxes, radio button, check box and text fields provided to make the process easier. Those fields mark * indicate the fields that the member must fill in. Error message will pop-up if the data key-in by the user is not valid. If the advertising process is successful, it will redirect to the upload page where member can upload pictures of their car.

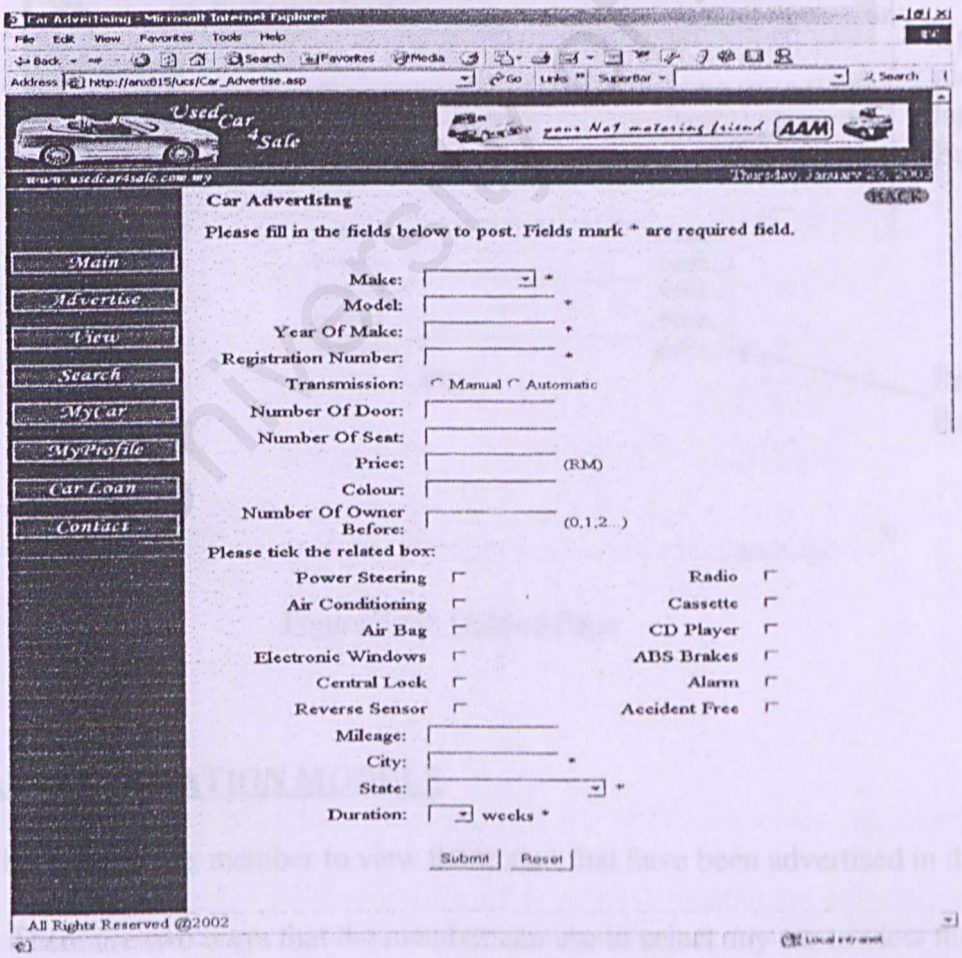

Figure 3.9: Advertise Page

3.2.3.2 Upload Page

After the advertising form has been submitted successfully, member will come to this upload page. In this page, member is allowed to upload up to 5 pictures of their car. They just need to click the "Browse" button and then browse to select the pictures that they want to upload. If the member is not ready to upload the pictures yet, then they can click the "Upload picture later" button. Later they can go to the Edit Car Module to upload or remove the car pictures. If the upload process is successful, it will redirect to the Advertise Page so that member can continue advertise another car.

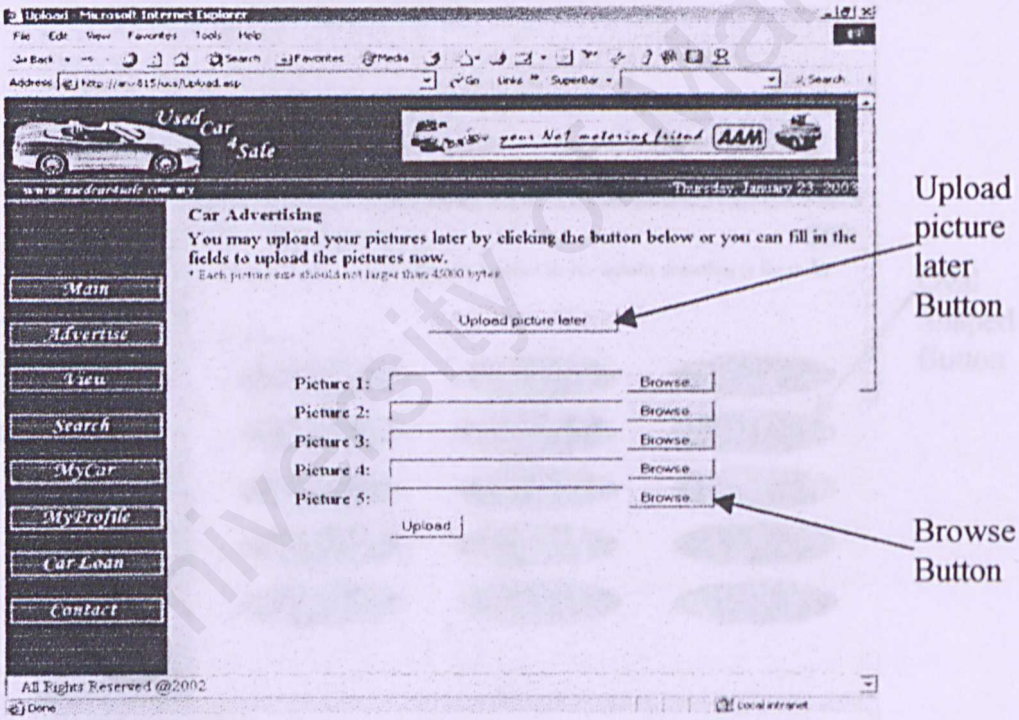

Figure 3.10: Upload Page

3.2.4 CAR INFORMATION MODULE

This module lets member to view those cars that have been advertised in the Website. There are two ways that the member can use to select any car to view the

information, one is view according to the car category and another way is by search according to selected criteria.

3.2.4.1 View By Category Page

In this page, all the car categories are shown in the blue colour oval shaped button. This is to make the interface more attractive. Each page will show 15 car categories, using the paging function in the print screen below can see the following car categories. Member can click on the oval shaped button so that all cars of the selected category will be shown in the next page.

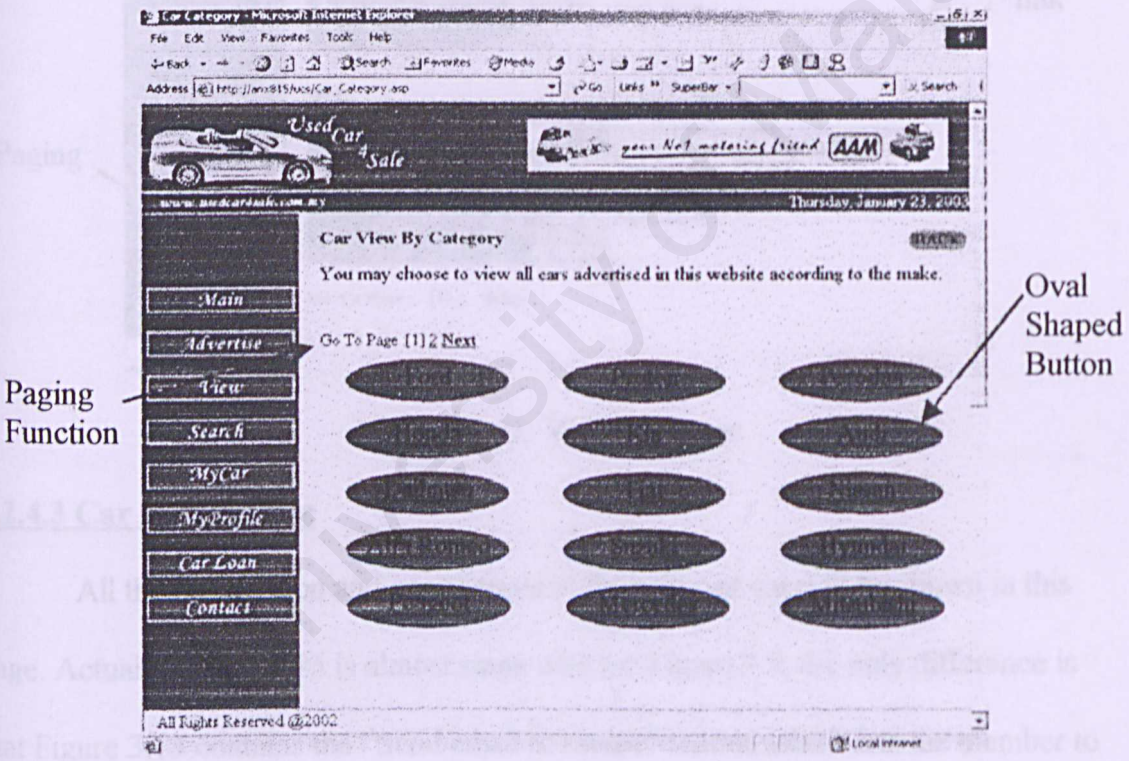

Figure 3.11: View By Category Page

3.2.4.2 View Car Page

This page will show all the cars of the category that the member has selected. One picture and some information of the car are briefly stated. In order to view all the information of the car, member can click the "Details" hyperlink to get to the Car

Details Page. Each page will only show 2 cars' record and the paging function is provided so that others results can be seen. After the consideration of the size of the car picture, 2 cars' record to be shown is believed to be suitable.

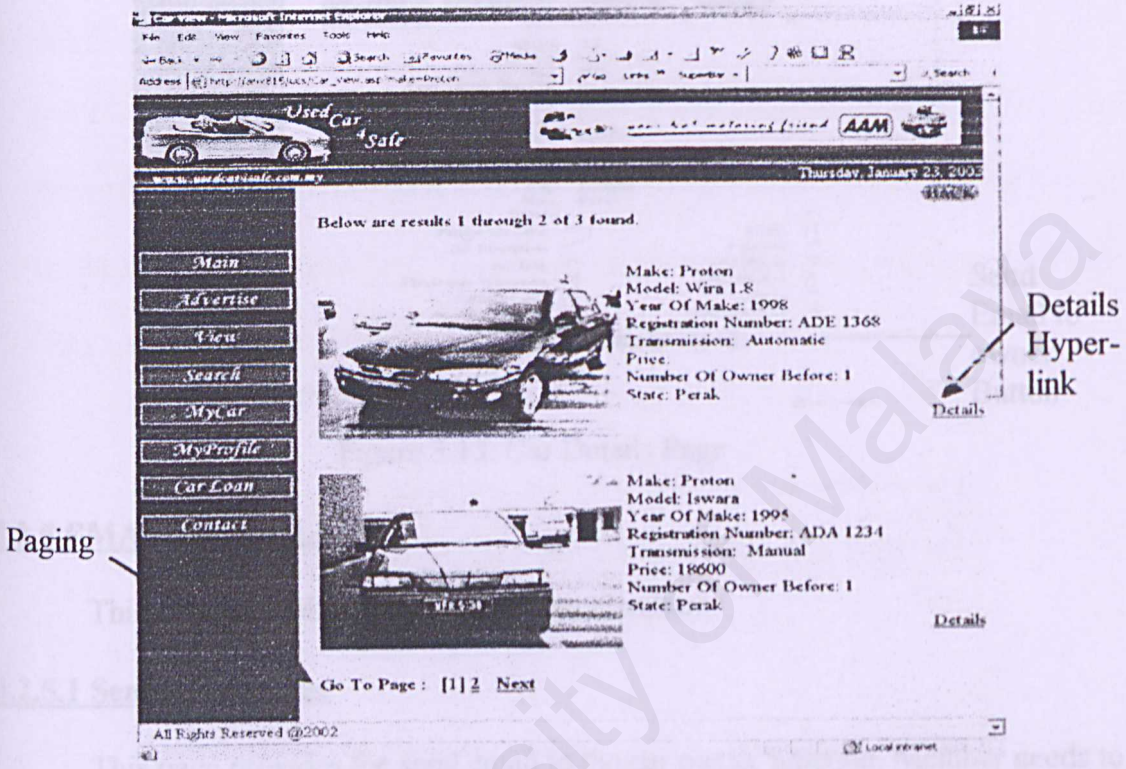

Figure 3.12: View Car Page

3.2.4.3 Car Details Page

All the information and car pictures of the selected car will be shown in this page. Actually Figure 3.13 is almost same with the Figure 3.5, the only difference is that Figure 3.13 contains the "Send email to owner" button, which lets the member to send email to the owner of that car if the member is really interested in that car.

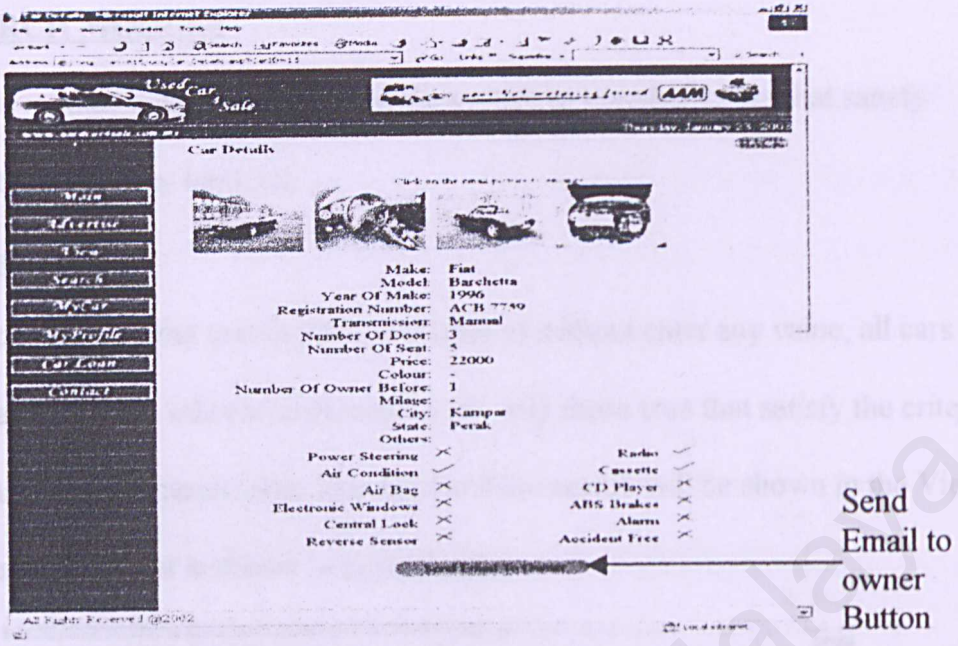

Figure 3.13: Car Details Page

3.2.5 EMAIL MODULE

This module enables contact between members.

3.2.5.1 Send Email Page

This page provides the send email to the car owner function. Member needs to fill in then form and click the "send" button. A message will be shown to tell member whether the send email process is success or fail.

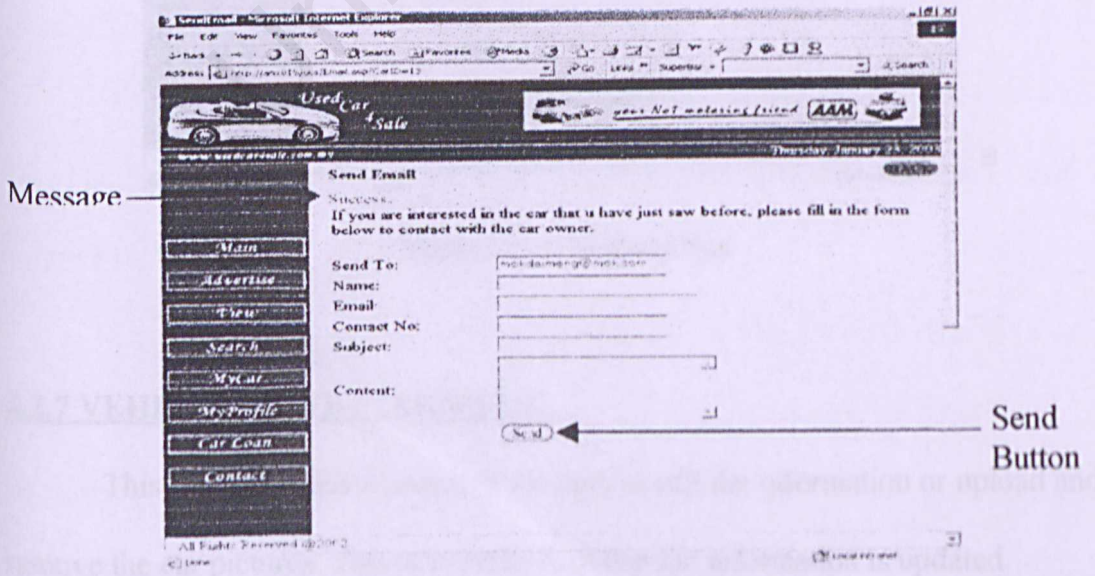

Figure 3.14: Send Email Page

3.2.6 SEARCH MODULE

This module enables members of the system to search for cars that satisfy several criteria that they have set.

3.2.6.1 Search Page

In this page, if the search form is submitted without enter any value, all cars will be shown as the result, otherwise the results are only those cars that satisfy the criteria set by the user in the search form. The results of the search will be shown in the View Car Page, same as what is shown in figure 3.12.

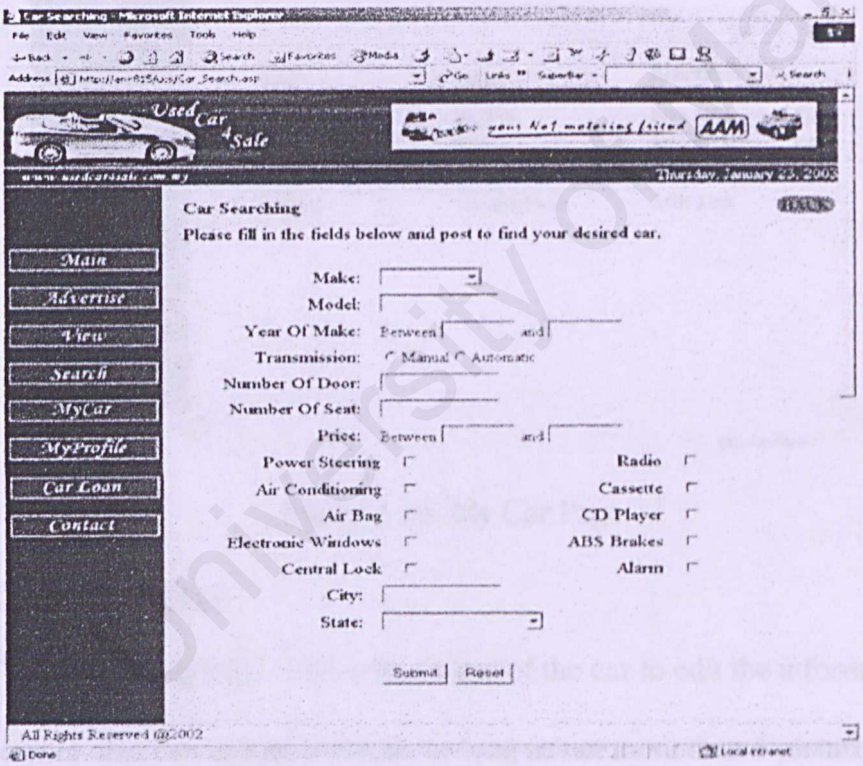

Figure 3.15: Search Page

3.2.7 VEHICLE EDITING MODULE

This module enables owner of the cars to edit the information or upload and remove the car pictures. This is to make sure that the information is updated.

3.2.7.1 My Car Page

This page shows all the cars that the member has advertised. The cars will be list down with the information about the make, model and registration number of the car. In order to edit the information of a particular car, the member has to click on the "Edit" hyperlink to go to the Car Editing Page.

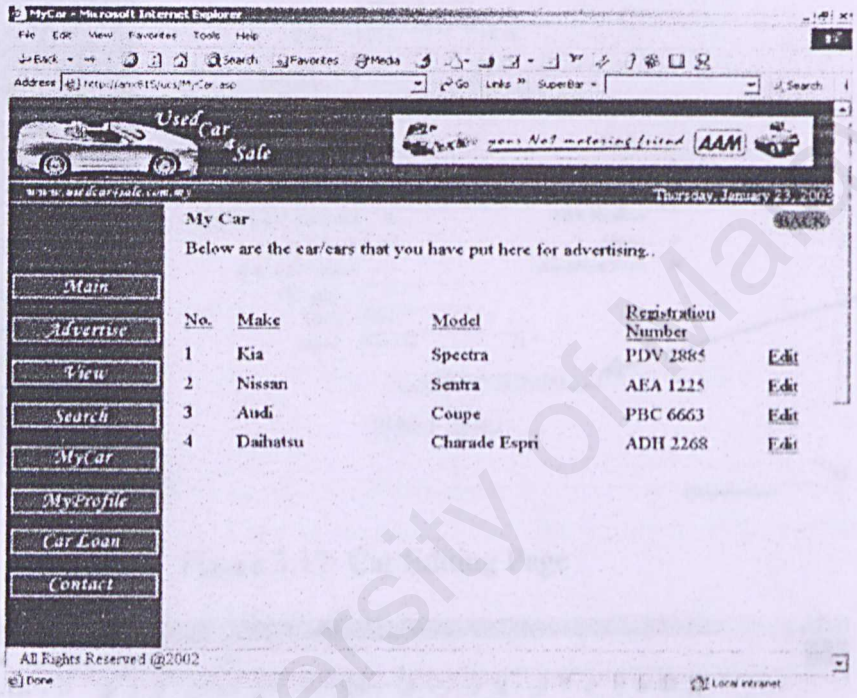

Figure 3.16: My Car Page

3.2.7.2 Car Editing Page

The Car Editing Page allows the owner of the car to edit the information of the car. The owner also can upload pictures, as long as not more than 5 pictures, and remove pictures.

Figure 3.17 below is the Car Editing Page while the Figure 3.18 is the Car Pictures Editing Pop-up Window that lets the car owner to upload or remove car pictures. That window will pop-up when the car owner clicks on the "Add/Remove Pictures" button.

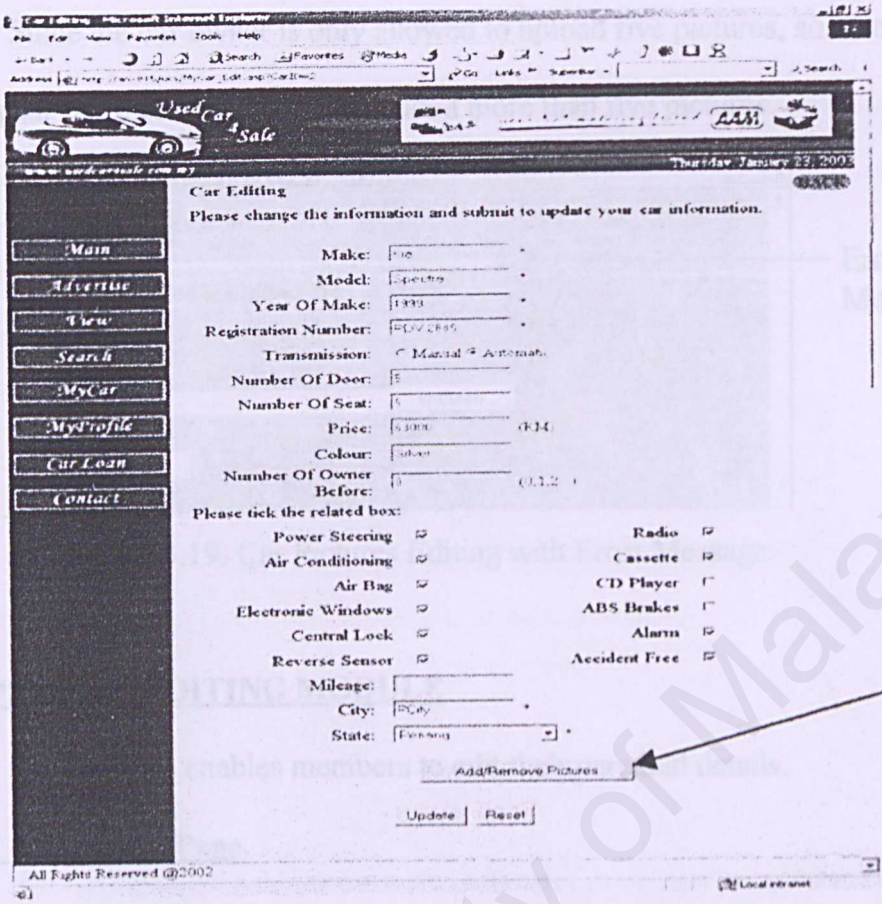

Figure 3.17: Car Editing Page

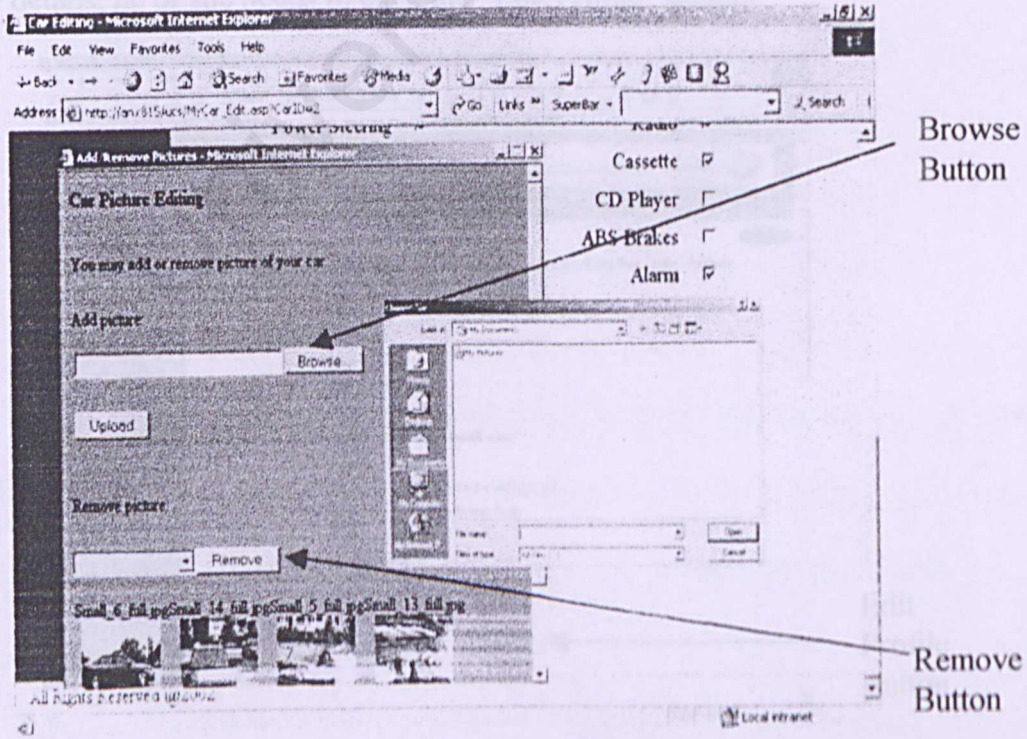

Figure 3.18: Car Pictures Editing Pop-up Window

Since the car owner is only allowed to upload five pictures, so an error message will appear if the car owners try to upload more than five pictures.

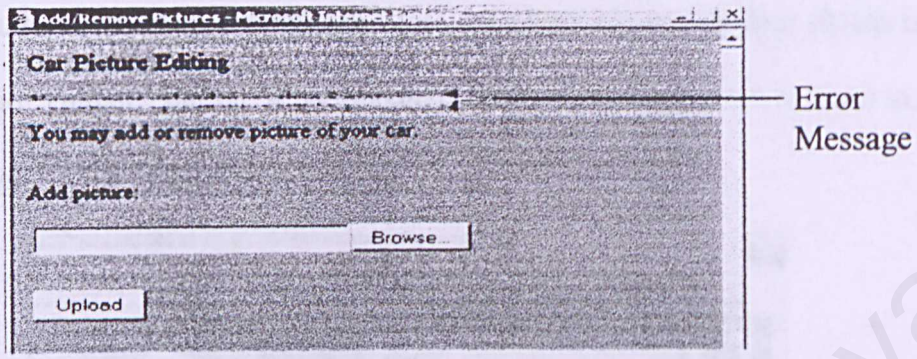

Figure 3.19: Car Pictures Editing with Error Message

3.2.8 PROFILE EDITING MODULE

This module enables members to edit their personal details.

3.2.8.1 My Profile Page

This page will show all the information of the member. If the member wants to edit the details, he or she needs to click the "Edit Profile" button.

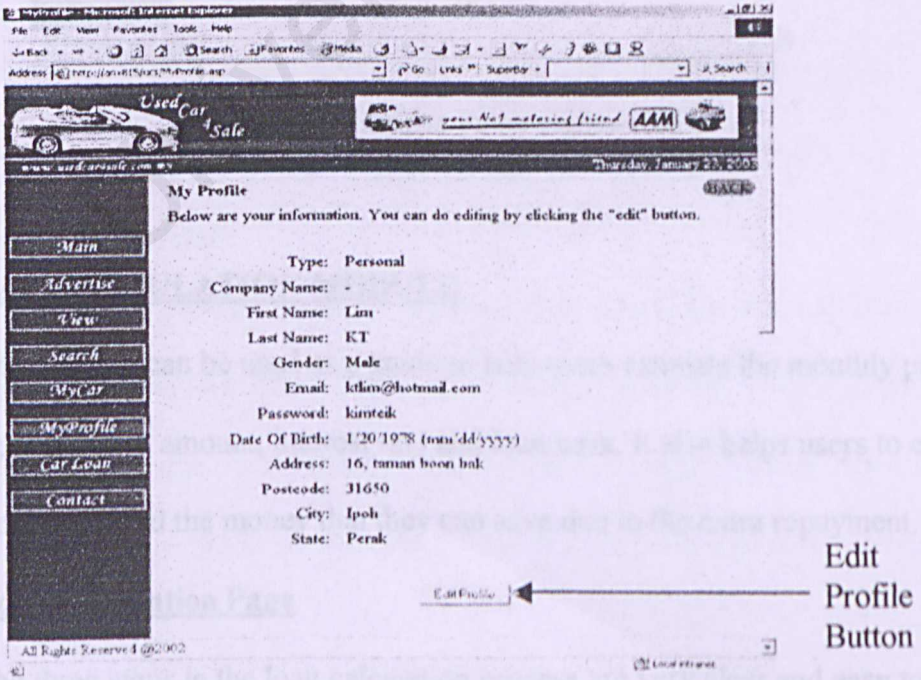

Figure 3.20: My Profile Page

3.2.8.2 Profile Editing Page

Members will come to this Profile Editing Page after they click the "Edit Profile" button in the My Profile Page. Here, members can update their details by clicking the "Update" button. If the update process is success, it will redirect to the My Profile page.

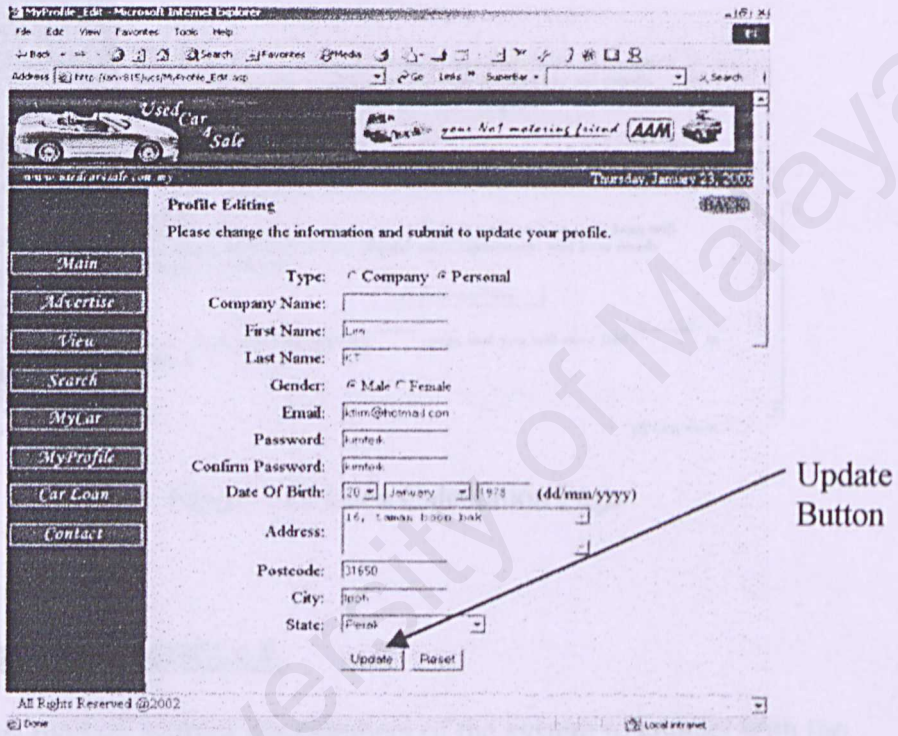

Figure 3.21: Profile Editing Page

3.2.9 LOAN CALCULATION MODULE

This module can be used as a guide to help users estimate the monthly payment according to the loan amount, interest rate and loan term. It also helps users to estimate the new loan term and the money that they can save due to the extra repayment.

3.2.9.1 Loan Calculation Page

The three steps in the loan calculation process are very clear and easy to understand in order to help the users.

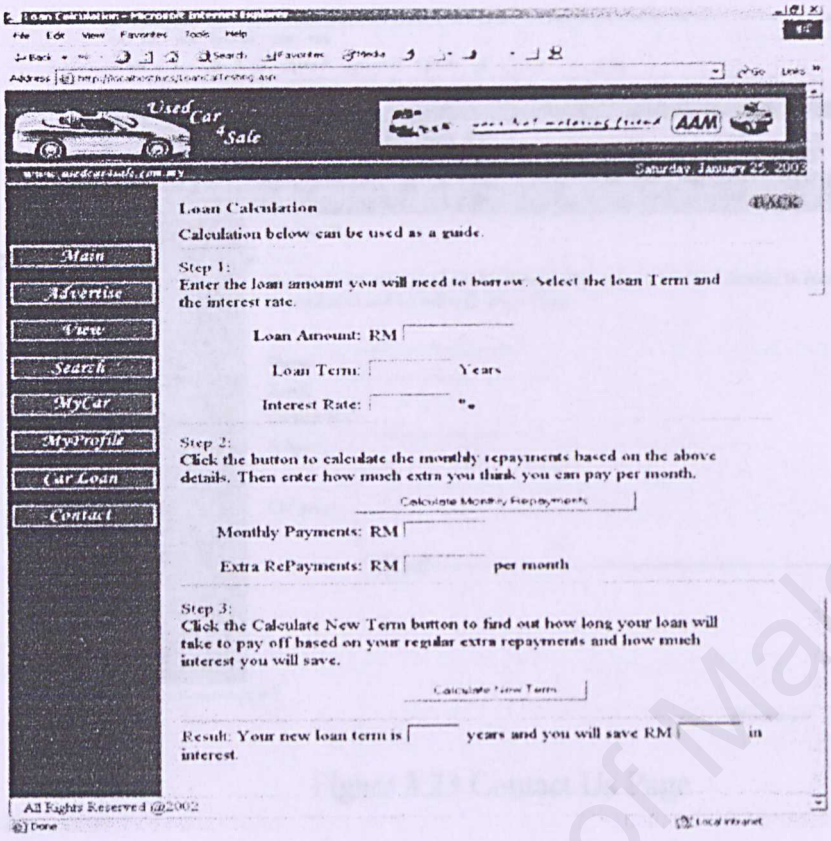

Figure 3.22 Loan Calculation Page

3.2.10 CONTACT MODULE

This module enables the members of the system to contact with the administrators of the system by sending email.

3.2.10.1 Contact Us Page

Before the members can send the email to the administrators, they have to fill in their name, email, contact number, the subject and their comment. An email will be send to the administrator when the members click on the "Send" button. A message will be shown to tell the members whether the email has been sent successfully or not.

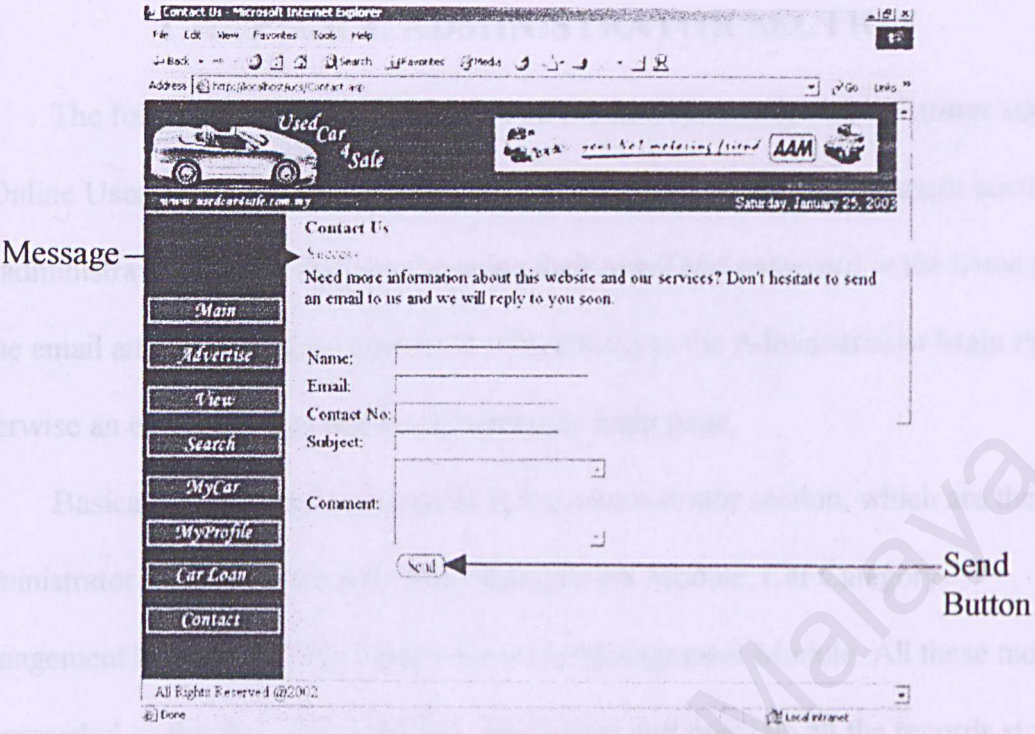

Figure 3.23 Contact Us Page

CHAPTER 4: ADMINISTRATOR SECTION

The following section will describe all the functions in the administrator section of Online Used Car Advertising System. In order to get into the administrator section, the administrators need to do login by using their email and password in the home page. If the email and password are correct, it will redirect to the Administration Main Page, otherwise an error message will be shown in the login page.

Basically there are four modules in the administrator section, which are the Add Administrator Module, User Accounts Management Module, Car Category Management Module and the Vehicle Records Management Module. All these modules are provided so that the administrators can manage and maintain all the records stored in the database.

4.1 ADD ADMINISTRATOR MODULE

This module enables administrators to add others administrator. The information of the new administrator, such as the name, email and password will be filled into the form and add as a record in the database.

4.1.1 Administration Main Page

This is the first page where the administrators will reach after they login successfully. There is a menu bar in every page which enable administrator to swift to others page easily. In this page, new administrator can be added. When the "Add" button is clicked, the record will be saved into the database. A message will be shown to tell the administrator whether the process is success or fail.

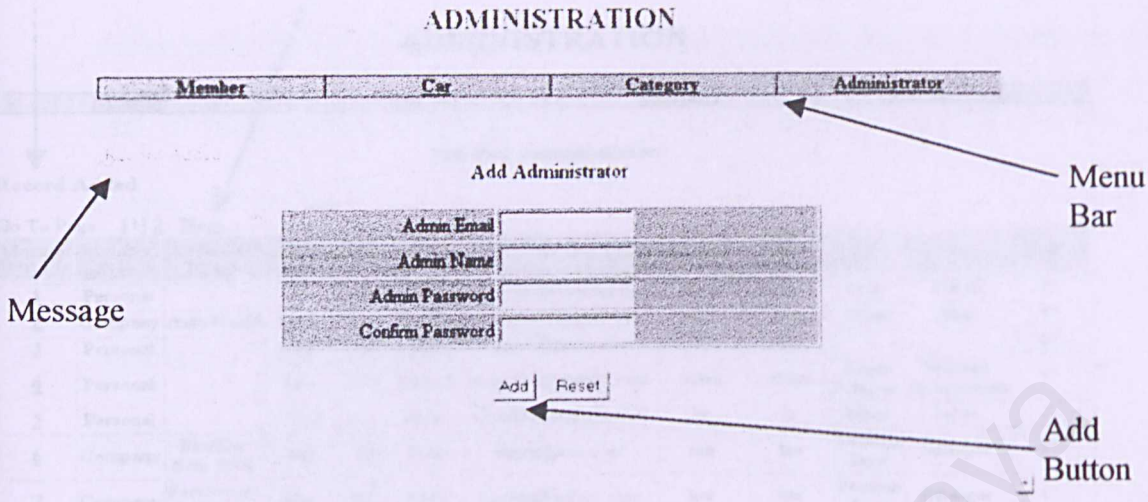

Figure 4.1: Administration Main Page

4.2 USER ACCOUNTS MANAGEMENT MODULE

This module enables the administrators to manage the records of all members. Administrators can view the details of all the members in a list, update the details of the members or even delete the record of the members in the database.

4.2.1 Member Listing Page

This page will list down the records of all the members of the system according to the Member ID. Administrator can view the details or update the details by click on the Member ID of the selected record to go to the Member Details Page. To add a new record of the member, the "Add New Record" button must be click so that it will redirect to the Member Details Page. To delete members' record, administrators can do that after they get into the Member Details Page or they can delete records by make a tick in the checkbox and then click the "Delete Checked Records" button. A confirm message will prompt out before the records are deleted. Please refer to Figure 4.5.

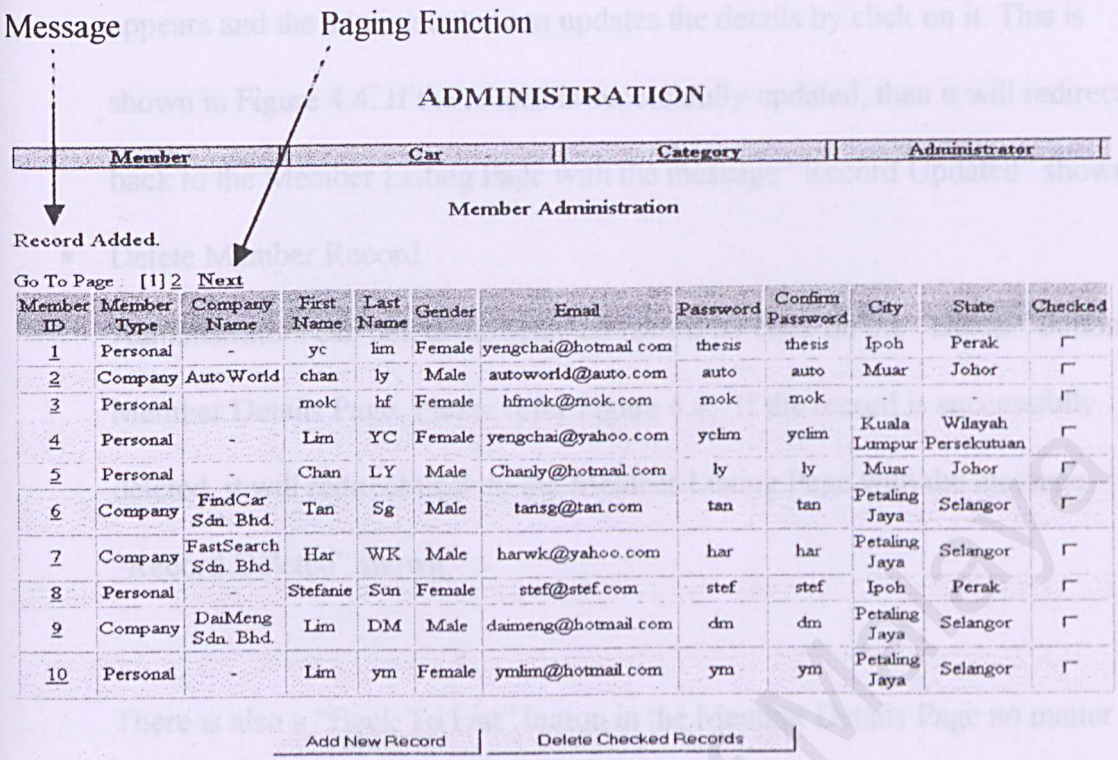

Figure 4.2: Member Listing Page with Record Added Message

4.2.2 Member Details Page

There are three actions that can be taken by the administrators when they get into the Member Details Page. Those actions are:

- Add Member

  If the administrator click the "Add New Record" button in the Member Listing Page, then the "Add" button will be shown in the Member Details Page, as shown in Figure 4.3. If the administrator click the "Add" button and the record is successfully added into the database, it will redirect back to the Member Listing Page with the message "Record Added" shown, as depicted in Figure 4.2

- Update Member Record

  All the details of the selected member are shown in a form if the administrator clicks on the Member ID in the Member Listing Page. The "Update" button will

appears and the administrator can updates the details by click on it. This is shown in Figure 4.4. If the record is successfully updated, then it will redirect back to the Member Listing Page with the message "Record Updated" shown.

- Delete Member Record

  Administrators can delete the selected record by click on the "Delete" button in Member Details Page. Please refer Figure 4.4. If the record is successfully deleted, it will redirect back to the Member Listing Page with the message "Record Deleted" shown.

There is also a "Back To List" button in the Member Details Page no matter what the action is to be taken. It enables administrator to click on it to go back to the listing page.

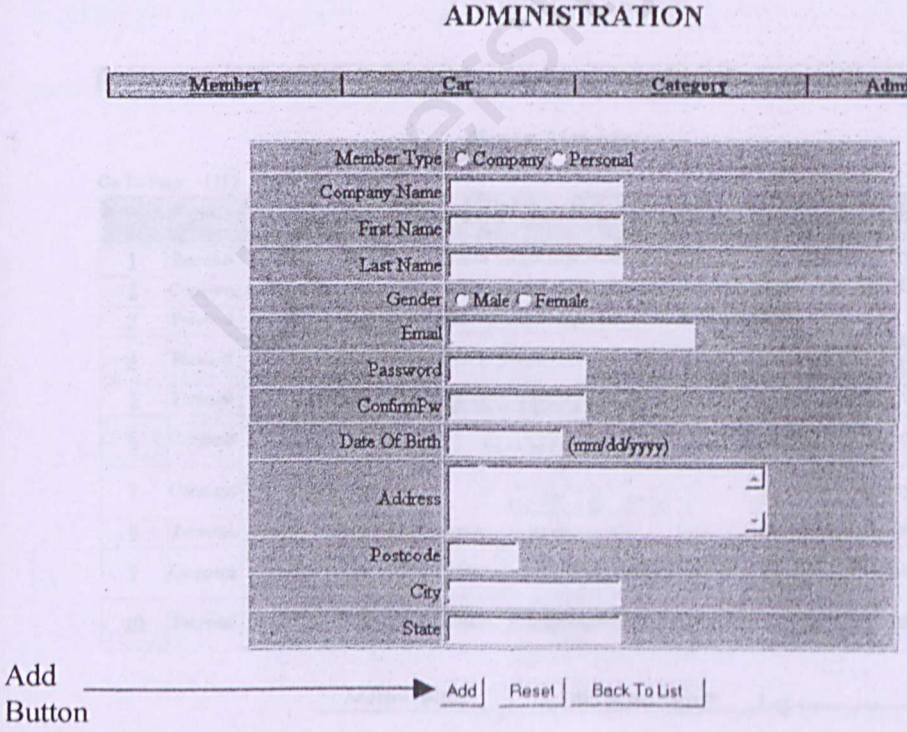

Figure 4.3: Member Details Page – Add Member

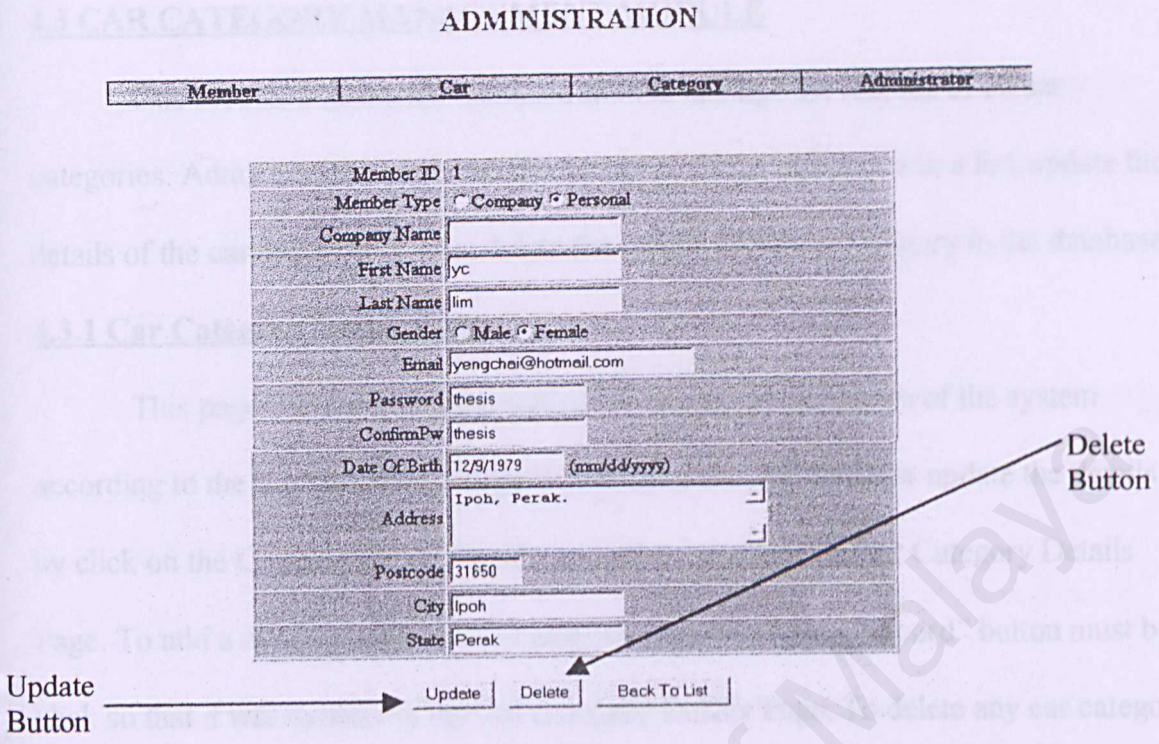

Figure 4.4: Member Details Page – Update and Delete Member Record

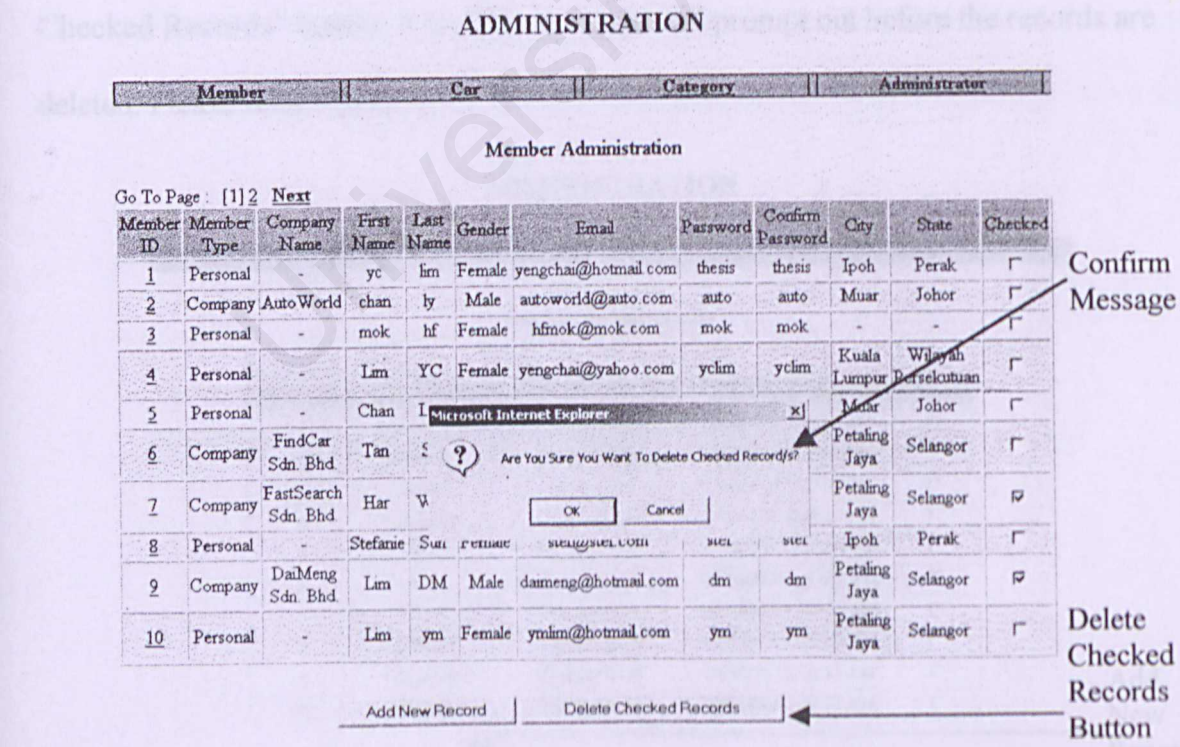

Figure 4.5: Member Listing Page with Delete Confirmation Message

4.3 CAR CATEGORY MANAGEMENT MODULE

This module enables the administrators to manage the records of all car categories. Administrators can view the details of all car categories in a list, update the details of the car category or even delete the record of the car category in the database.

4.3.1 Car Category Listing Page

This page will list down the records of all the car categories of the system according to the Category ID. Administrator can view the details or update the details by click on the Category ID of the selected record to go to the Car Category Details Page. To add a new record of the car category, the "Add New Record" button must be click so that it will redirect to the Car Category Details Page. To delete any car category record, administrators can do that after they get into the Car Category Details Page or they can delete records by make a tick in the checkbox and then click the "Delete Checked Records" button. A confirm message will prompt out before the records are deleted. Please refer Figure 4.9.

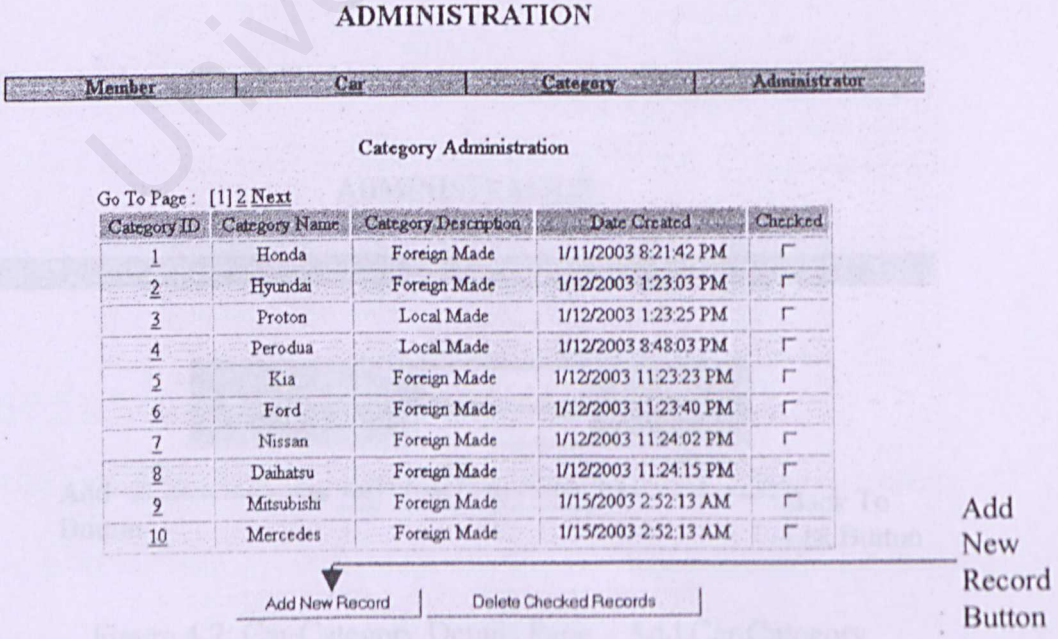

Figure 4.6: Car Category Listing Page

4.3.2 Car Category Details Page

There are three actions that can be taken by the administrators when they get into the Car Category Details Page. Actually it is almost the same as the Member Details Page. Those actions are:

- Add Car Category

  This will add new car category record into the database. It is similar to the Add Member function in 4.2.2. The add car category record form is shown in Figure 4.7.

- Update Car Category Record

  This will update the car category record in the database. It is similar to the Update Member Record function in 4.2.2. The form is shown in Figure 4.8.

- Delete Car Category Record

  This will delete the car category record in the database. It is similar to the Delete Member Record function in 4.2.2. The delete record form is shown in Figure 4.9

There is also a "Back To List" button in the Car Category Details Page.

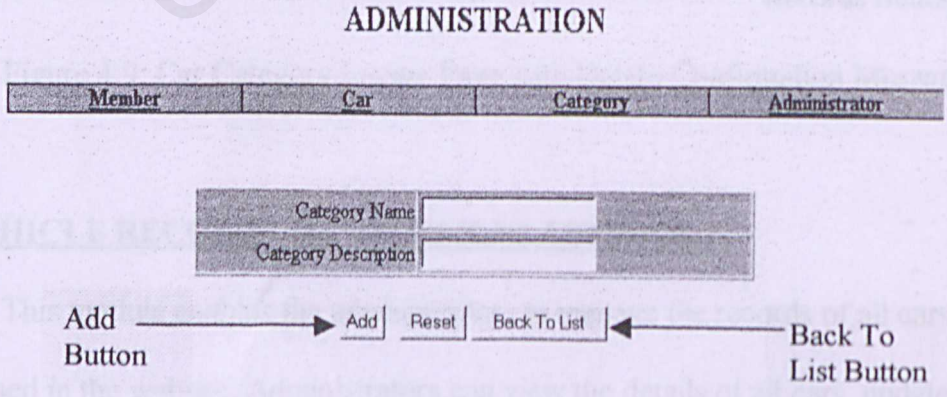

Figure 4.7: Car Category Details Page – Add Car Category

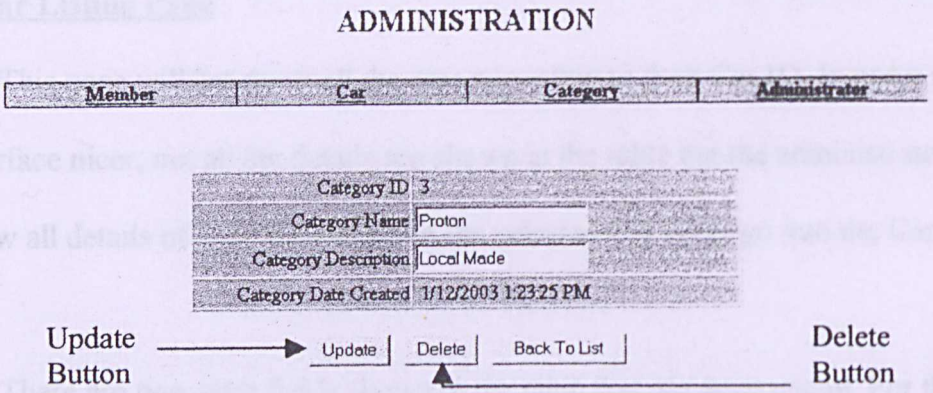

Figure 4.8: Car Category Details Page – Update and Delete Car Category Record

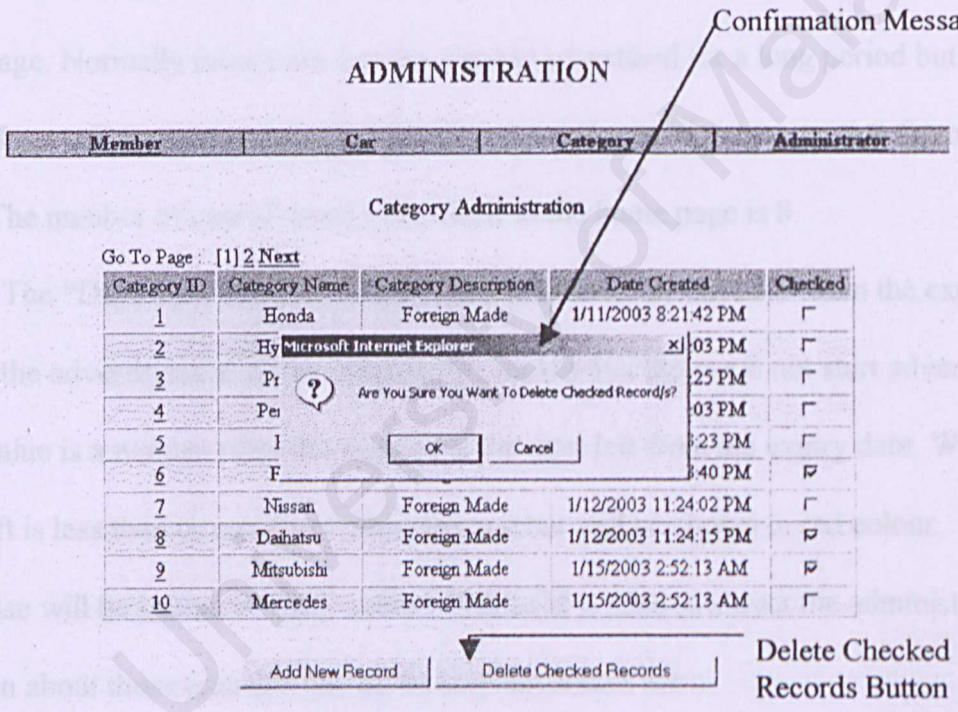

Figure 4.9: Car Category Listing Page with Delete Confirmation Message

4.4 VEHICLE RECORDS MANAGEMENT MODULE

This module enables the administrators to manage the records of all cars advertised in the website. Administrators can view the details of all cars, update the details of the car or even delete the record of the car in the database.

4.4.1 Car Listing Page

This page will list down all the cars according to their Car ID. In order to keep the interface nicer, not all the details are shown in the table but the administrator still can view all details of the car by click on the selected Car ID to go into the Car Details Page.

There are two extra fields shown in the table that are quite useful. For the "Top" field, if the value is "False", that particular car will not be shown in the home page. On the other hand, if the value if "True", means that particular car will be shown in the home page. Normally those cars that are already advertised for a long period but still not sold yet will be set the value to "True" in order to attract more attention from the users. The number of cars allowed to be show in the home page is 8.

The "Days Left" field is used to indicate how many days left from the expiry date of the advertised car. If the value is "-", means that the car is not start advertise yet. If the value is a number, then the number is the days left from the expiry date. When the days left is less than or equal to 7, then the number will be shown in red colour, otherwise will be shown in black colour. This field is used to attract the administrators attention about those cars that should be stop advertises soon.

Top	Days Left
False	-
True	27
False	3
False	-
False	7

Figure 4.10: "Top" and "Days Left" Field

Others fields that are shown in the table are Car ID, Make, Model, Year Of Make, Registration Number, Transmission, Price, Mileage, City, State, Duration and the Status. If the car is being advertised, the value of the Status field is "True" and the value is "False" if the car is not start advertise yet.

ADMINISTRATION

Member | Car | Category | Administrator

Car Administration

Go To Page [1] Next

Car ID	Owner ID	Make	Model	Year Of Make	Registration Number	Transmission	Price	Mileage	City	State	Duration	Status	Top	Days Left	Checked
1	1	Honda	Accord 2.0	1997	ADK 3361	Manual	58710	32006	Ipoh	Perak	6	False	False	-	☐
2	1	Proton	Iswara A/E 1.3	2002	AEQ 9882	Manual	35040	4368	Ipoh	Perak	6	True	True	370	☐
4	1	Honda	Civic 2.0	1999	JGH 6683	Automatic	-	-	Muar	Johor	6	True	True	177	☐
7	2	Hyundai	Sonata	2002	WET 8852	-	-	-	KL	Wilayah Persekutuan	1	True	True	27	☐
15	6	Nissan	Sentra	1998	WJH 2316	Automatic	58050	53871	Kuala Lumpur	Wilayah Persekutuan	3	False	False	-	☐
16	3	Ford	Lynx	1997	BEU 6668	Automatic	-	-	Petaling Jaya	Selangor	3	True	False	87	☐
17	1	Daihatsu	Charade Espri	1995	ADH 2268	Manual	26550	-	Ipoh	Perak	3	True	False	3	☐
18	2	Kia	Spectra	1999	BFE 1662	Automatic	63880	32668	Petaling Jaya	Selangor	3	False	False	-	☐
19	1	Honda	Civic	2000	ADS2268	Automatic	50000	11000	Ipoh	Perak	3	True	False	7	☐
20	3	Proton	Iswara	2000	ADU 3684	Manual	26880	26598	Kampar	Perak	6	True	False	177	☐

Add New Record | Delete Checked Records

Figure 4.11: Car Listing Page

4.4.2 Car Details Page

There are three actions that can be taken by the administrators when they get into the Car Category Details Page, similar to the Member Details Page. Those actions are:

- Add Car

  This will add new car record into the database. It is similar to the Add Member function in 4.2.2. The add car record form is shown in Figure 4.12.

- Update Car Record

This will update the car record in the database. It is similar to the Update Member Record function in 4.2.2. The update car record form is shown in Figure 4.13.

- Delete Car Record

  This will delete the car record in the database. It is similar to the Delete Member Record function in 4.2.2. The delete car record form is shown in Figure 4.14.

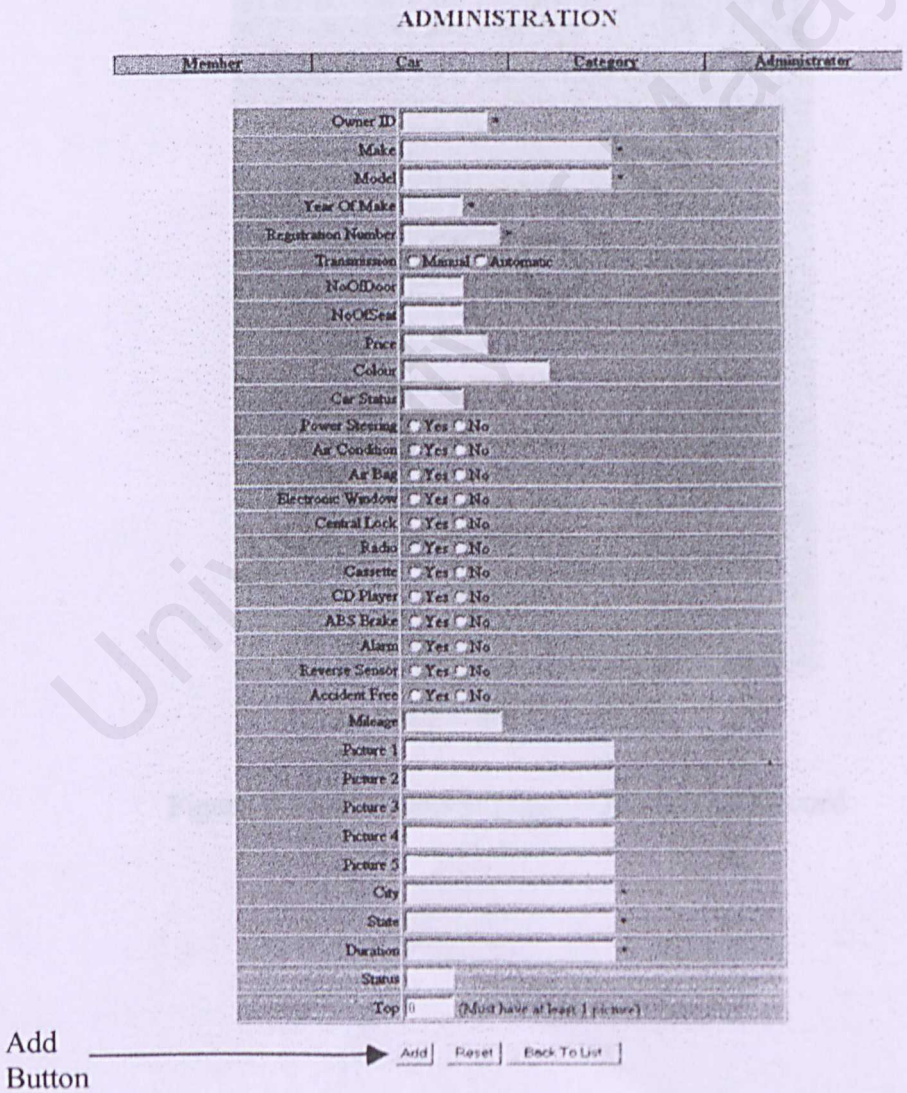

Figure 4.12: Car Details Page – Add Car

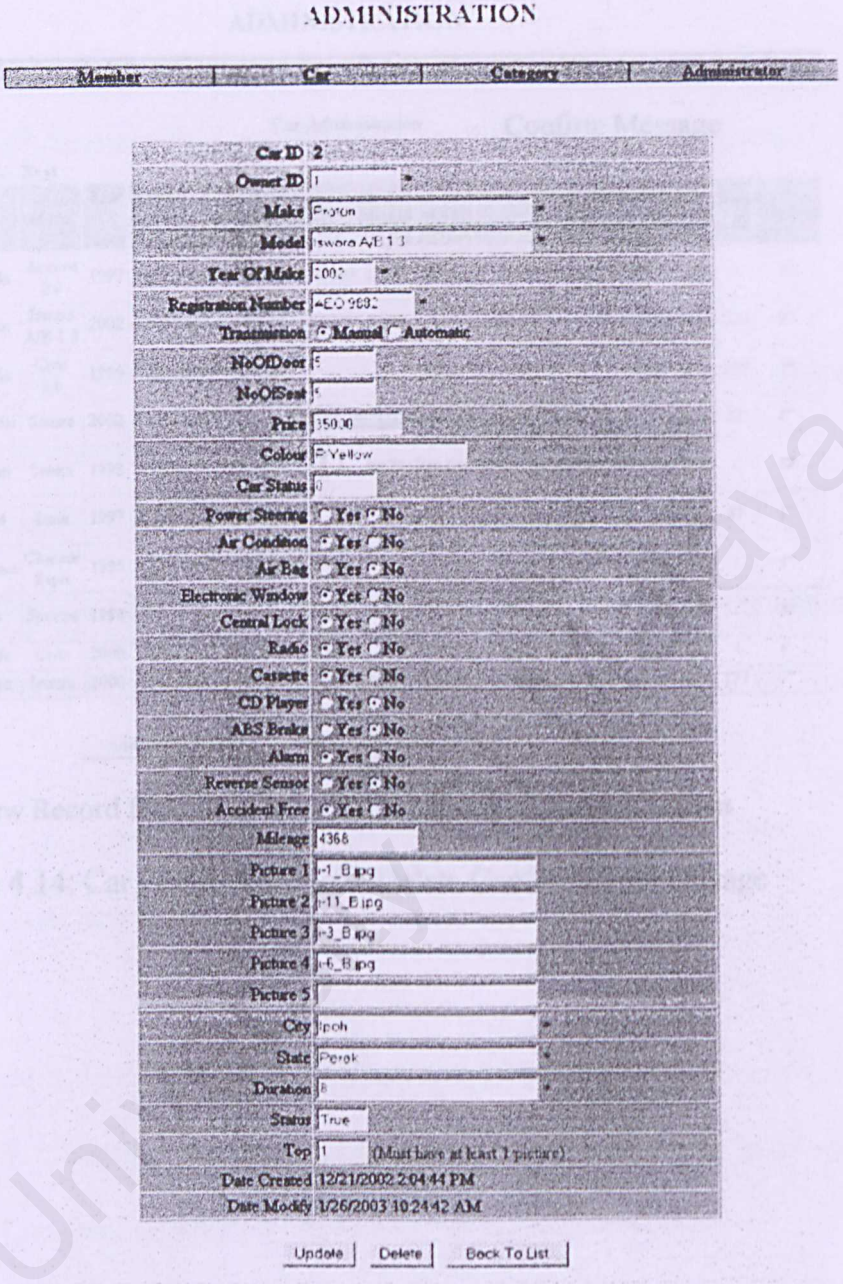

Figure 4.13: Car Details Page – Update Car Record

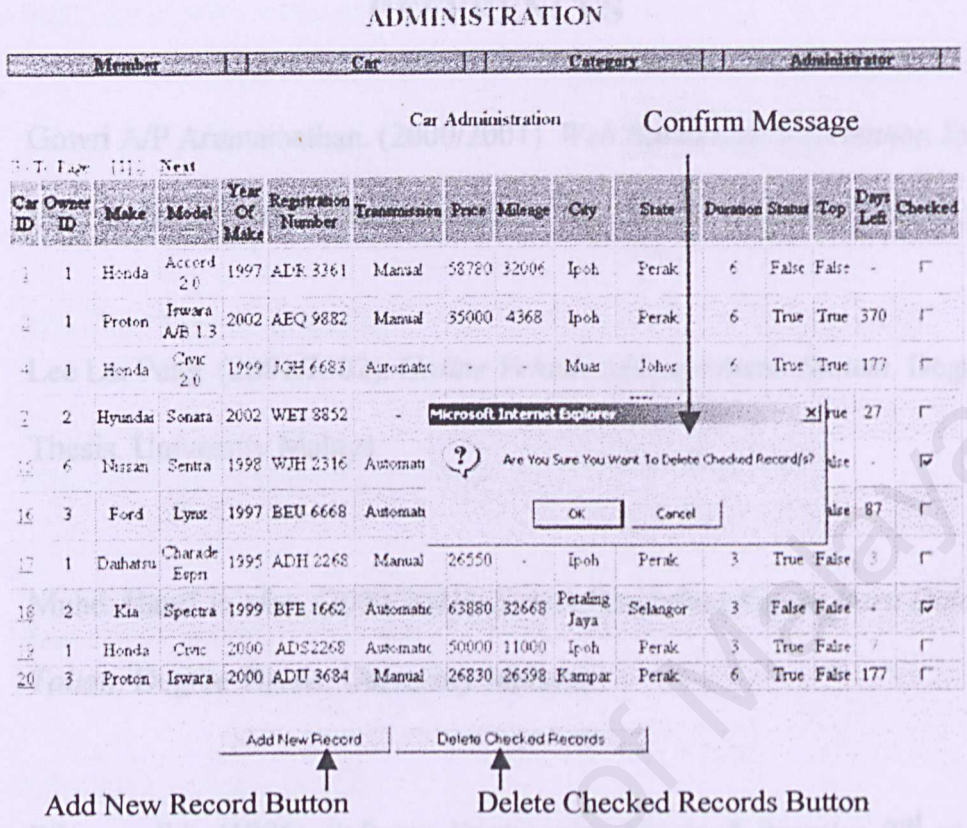

Figure 4.14: Car Listing Page with Delete Confirmation Message

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- http://www.serverwatch.internet.com
- http://www.webopedia.com
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